IROQUOIS ARITHMETICS

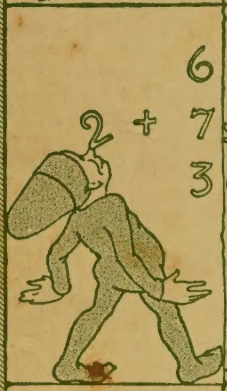
BOOK ONE

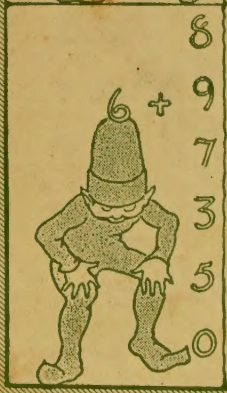
De Groat
Firman
Smith

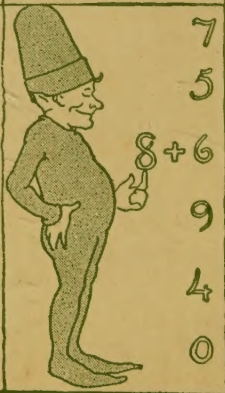
Iroquois Publishing Company

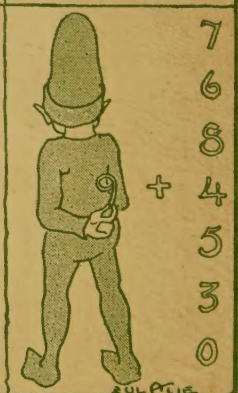
THESE GOBLINS WILL CATCH YOU IF YOU DON'T WATCH OUT

ADD TO THE NUMBER THE GOBLIN HOLDS EACH OF THE NUMBERS AT HIS SIDE





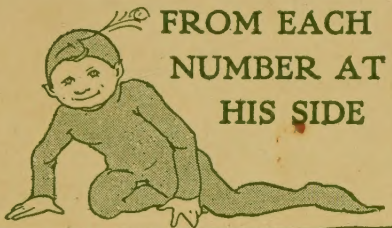


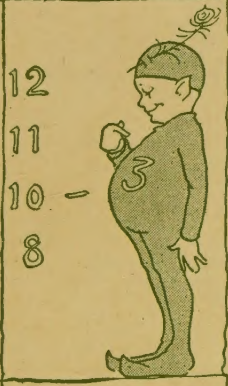


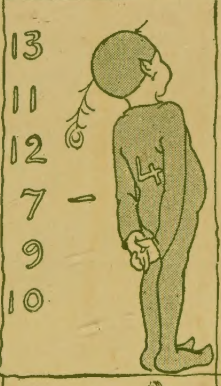
THESE GOBLINS WILL CATCH YOU IF YOU DON'T WATCH OUT

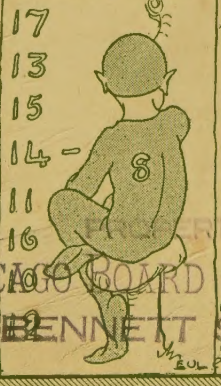
E5

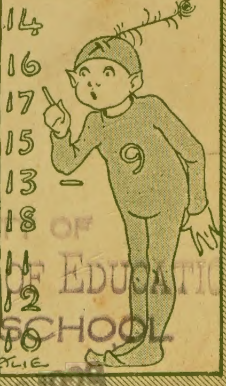
SUBTRACT THE NUMBER ON THE GOBLIN'S SWEATER FROM EACH NUMBER AT HIS SIDE











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THE IROQUOIS ARITHMETICS

FOR SCHOOL AND LIFE

BOOK ONE

GRADES THREE AND FOUR

BY

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IROQUOIS PUBLISHING COMPANY, INC.
SYRACUSE, N. Y.

THE IROQUOIS ARITHMETICS

FOR SCHOOL AND LIFE

DeCroat Firman Smith

TWO BOOK SERIES

ELEMENTARY, Grades Three, Four and Five

Including a review of
Grades One and Two

ADVANCED, Grades Six, Seven and Eight

THREE BOOK SERIES

BOOK ONE, Grades Three and Four

Including a review of
Grades One and Two

BOOK TWO, Grades Five and Six

BOOK THREE, Grades Seven and Eight

SERIES BY GRADES

Grade Three

Including a review of
Grades One and Two

Grade Four

Grade Five

Grade Six

Grade Seven

Grade Eight

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Syracuse, New York

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To Teachers of Arithmetic:

The Iroquois Arithmetics represent a distinct advance in arithmetic textbook achievement. They bring to pupil and teacher not only the experience of successful arithmetic teachers but also the results of modern researches and surveys. These investigations are demonstrating scientifically where the real difficulties lie and how to meet them. Three noteworthy investigations have been constantly before the authors:

1. Number Combinations, Their Relative Difficulty and the Frequency of their Appearance in Textbooks, by Frank L. Clapp, Bureau of Educational Research, University of Wisconsin.

2. Research in Constructing the Elementary School Curriculum, by the sub-committee of the National Education Association.

3. Summary of Educational Investigations Relating to Arithmetic, by Guy Thomas Buswell and Charles Hubbard Judd.

The University of Wisconsin investigation clearly points out the relative difficulty of all number combinations and how arithmetic texts in the future should emphasize them. Utilizing these facts the authors give the pupils drill in proportion to the relative difficulty of the 390 number combinations in addition, subtraction, multiplication and division. In a similar manner the results of the other recognized investigations are utilized.

Furthermore, the authors have carefully considered the latest and most generally accepted courses of study in the subject, including the New York State course of study, those for Baltimore County, Baltimore City and

Minneapolis, as well as all State courses of study in arithmetic that have recently been issued, in order that this series might meet nationwide and present-day demands.

THE IROQUOIS ARITHMETIC SERIES

The Plan.

To begin with, these books are built for the pupil, to create in the pupil's mind a desire to use numbers and to supply the means of satisfying that desire.

With the watchword "teach only one difficulty at a time" a three-fold plan has been used.

1. By skillful use of child experience a need is created in the pupil's mind for each operation before introducing the procedure.

2. Each process or variation of each process is built upon a concrete situation of interest to a child—one in which the application of numbers unfolds a new interest.

3. The necessary graded drill in abstract number work is interspersed with problems of real child appeal which provide a reason for learning how to use numbers.

Language and Illustrations.

The language of these texts is noteworthy in its fitness to the pupil's stage of development. It is accurate and concise but never over the head of the pupil nor yet too childish. Each picture has a definite and real purpose.

Reviews.

The review features are skillfully handled by the accumulative method which constantly introduces, in new settings, the topics previously studied, thus avoiding what the pupil often regards as the monotony of review.

Tests.

Tests introduced at frequent intervals as well as at the end of each book provide a means for continuous measurement of attainment. These tests are devised to determine the needs of individual pupils, and to separate what the pupil knows from what he does not know, thereby determining specifically and accurately what drill is needed.

Oral and Written Work.

No sharp demarcation is made between oral work and written work. Ample material is available for both but, with the wide differences in capacity and attainments of classes, it is believed best to leave to the teacher the decision as to which shall be oral.

Copying Minimized.

Care has been taken in spacing abstract drill on the page to minimize unnecessary copying. With a folded answer paper as shown opposite page 1 the pupil works from the printed page and writes only his answers.

BOOK ONE

Book One is for Grades 3 and 4, but includes a review of the work of the first and second grades. This review, though brief, is so complete that it is in itself an admirable text for the second grade, and introduces the pupil very gradually to the larger field of the third grade.

No teacher's manual is required. The text is a self-contained course of study. It is self-explanatory and in language that a pupil can understand.

Number Combinations.

The modern practice of teaching addition and subtraction by means of number combinations whose sums have

common endings, such as 5 and 15, is very completely carried out and thoroughly drilled in the third grade.

Each multiplication table is taught as a complete cycle and is developed by concrete illustrations. The cycle consists of first the multiplication in the regular order, then in the reverse order, then the corresponding division and last the corresponding fraction.

Process Development.

The developments of the four fundamental processes are unique in the way they combine simplicity and thoroughness. In each case a situation is presented for which the child himself wants a solution. Following each development are adequate drill and problems, thus carrying, through each procedure, two sound principles—first, "teach only one difficulty at a time"; second, "don't teach by drill; teach first and then drill."

Subtraction.

Three methods of subtracting whole numbers are presented on pages 48, 49 and 64. This has been done because extensive investigations have shown that all three methods are widely used. Consequently, the choice of method has been left to the judgment of the supervisors.

Explanations.

Each new step is carefully explained. Long deductive reasonings that a child cannot understand are avoided and still sufficient explanation is given, wherever practical, in order that the child can see the "why" of each step, and the "why" is always a child's "why." Furthermore, no erroneous methods or practices are introduced that must later be discontinued.

New Work of the Fourth Grade.

The new work of the fourth grade, long division and fractions, is worked out along the same lines of process development and drill as are used in the third grade—always introduced by concrete illustrations, always very simply developed with one difficulty at a time, always the plan—teach first and then drill.

The Problems.

The problems throughout are a source of inspiration. Each group of problems, each problem subject, each problem itself is a real problem in a child's life, designed to create a desire to use and to know numbers.

Illustrations.

Special note should be made of the illustrations inside the front and back covers of the book as exemplifying pictures with an appeal to the child and still having a scientific purpose. The goblins attract the child's attention and provide cleverly arranged drill on those number combinations which require most drill, as shown by the University of Wisconsin researches.

The authors wish to express their very great appreciation to the many teachers who through their criticisms and timely suggestions have done so much to perfect these books. They desire especially to acknowledge the many valuable contributions given by Miss M. Elsie Davis, formerly teacher of Arithmetic Methods in the City Training School, Buffalo, New York, and by Miss Ina M. Hayes, Supervisor of Arithmetic in the State Normal School, Cortland, New York.

IROQUOIS PUBLISHING COMPANY

TABLE OF CONTENTS

FIRST STEPS IN NUMBER

Preparing for Third Grade Work

	PAGE		PAGE
Counting	2	Addition and Subtraction	28
Learning to Add	3	Multiplication	38
Counting	6	Addition	41
United States Money	11	Addition and Subtraction	42
Addition	14	Multiplication	51
Learning to Subtract	19	Addition	54
Addition	22	Subtraction	55
Subtraction	23	One Hundred Addition Facts	56
Units and Tens	25	One Hundred Subtraction Facts	57
Reading and Writing Numbers	27	Test	58

THIRD GRADE — FIRST HALF

Reading and Writing Numbers	59	Multiplication	95
Roman Numerals	60	Dry Measure	97
How Clocks Tell Time	61	Multiplication	98
Addition	62	Division	99
Subtraction	64	Liquid Measure	102
Addition	68	Addition	103
Addition and Subtraction	70	Subtraction	105
Multiplication	73	Multiplication	106
Division	75	Addition	108
Measure of Length	78	Subtraction	111
Addition	80	Multiplication	113
Subtraction	82	Division	116
Multiplication	85	Addition	121
Division	88	Subtraction	123
Measure of Temperature	91	One Hundred Addition Facts	125
Addition	92	One Hundred Subtraction Facts	126
Subtraction	94	Tests	127

THIRD GRADE — SECOND HALF

	PAGE
Multiplication	130
Division	133
Using a Dozen	135
Addition	137
Division	138
Addition	144
Subtraction	145
Multiplication	146
Division	149
Addition	156
Subtraction	157
Reading and Writing Numbers	159
Multiplication	160
Division	162
Multiplication	167
Division	171
Measure of Weight	173
Division	174
Multiplication	176
Division	177
Multiplication	179
Division	183
Tests	184

FOURTH GRADE — FIRST HALF

Reading and Writing Numbers	188
Roman Numerals	189
Addition	190
Telling Time	192
Addition	194
United States Money	199
Subtraction	203
Measure of Time	204
One Hundred Multiplication Facts	212
Multiplication	213
Measure of Length	215
Factors and Multiples	217
Multiplication	218
Liquid Measure	224
Dry Measure	228
Measure of Weight	234
Ninety Division Facts	237
Short Division	238
Fractions	242
Tests	250

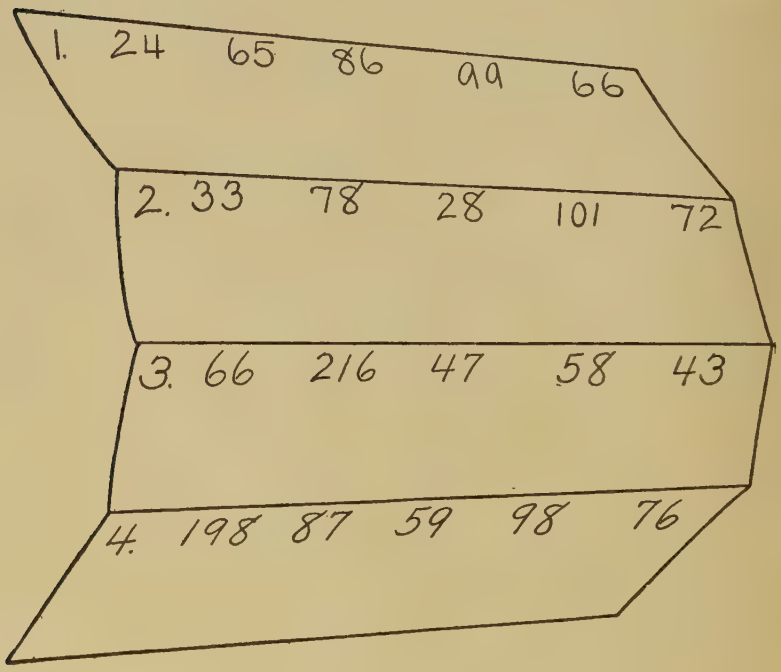
FOURTH GRADE — SECOND HALF

Reading and Writing Arabic and Roman Numbers	254
Addition and Subtraction	255
Two-Step Problems	260
Multiplication	262
Ninety Division Facts Drill	266
Averages	268
Long Division	270
Estimating Answers	273
Fractions	289
Tests	303
Graded Difficulty Tests	305

NEVER WRITE IN YOUR BOOK

When your book tells you to do some work without copying, place a piece of paper below the first row of examples and write your answers on it. Then fold these answers down, place the fold below the second row of examples and write their answers. Number each row.

This is the way your paper will look, if you have four rows of answers.



FIRST STEPS IN NUMBER

PREPARING FOR THIRD GRADE WORK

SCHOOL DAYS

What do you do at recess?

1. Count all the children in this school yard.

2. How many boys are there? How many girls?

3. Do you see the boys playing tag? How many are there? Which one is "it"?

4. How many children are playing ball? How many bats have they?

5. Can you find the children having the tug of war? How many are there? How many boys? How many girls? Which side do you think is winning?

6. Do you see the marble game? How many marbles can you see?

7. Let's count everything we can see in the picture.

COUNTING

1. Write the numbers as far as 30 in this way: 1, 2, 3, and so on.

2. Write the words for the numbers as far as twenty-one in this way: One, two, three.

3. Read these numbers. Speak louder when you say the darker numbers: 1, **2**, 3, **4**, 5, **6**, 7, **8**, 9, **10**, 11, **12**, 13, **14**, 15, **16**, 17, **18**, 19, **20**.

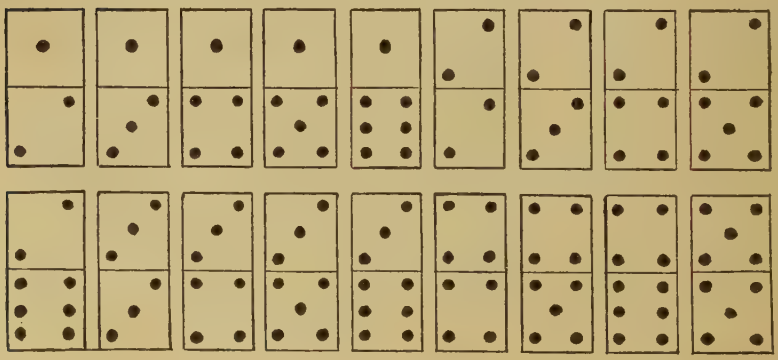
The numbers 1, 3, 5, 7 and so on are called **odd numbers.**

The numbers 2, 4, 6, 8 are called **even numbers.**

When we give every number in counting we call it counting by ones, in this way: 1, 2, 3.

When we give only the odd numbers or the even numbers, we call it counting by twos: as 1, 3, 5; or 2, 4, 6.

MAKE DOMINOES LIKE THESE



LEARNING TO ADD

One way

From the dots on this domino we learn that 2 and 1 are 3.

2 and 1 are 3.

$2+1=3$.

The other way

When the domino is turned we find that 1 and 2 are 3.

1 and 2 are 3.

$1+2=3$.

Putting 2 and 1 together to make 3 is called adding 2 and 1. Three is the *sum* of 2 and 1.

The sign of addition is +. It may be read *and*.

The sign = means *equal* or *are;* sometimes *equals* or *is*.

Add the dots on your domino cards first in one way and then in the other to help you find the sums of these numbers:

1. $3+1=?$ 4
2. $1+3=?$ 4
3. $4+1=?$ 5
4. $1+4=?$ 5
5. $5+1=?$ 6
6. $1+5=?$ 6
7. $6+1=?$ 7
8. $1+6=?$ 7
9. $2+2=?$ 4
10. $3+2=?$ 4
11. $2+3=?$ 5
12. $3+3=?$ 6
13. $4+2=?$
14. $2+4=?$
15. $5+2=?$
16. $2+5=?$
17. $6+2=?$
18. $2+6=?$

1. Annie has 3 dolls and Grace has 2 dolls. How many dolls have both? 5

2. Tom had 5 marbles and bought 2 more. How many marbles did he have then? 7

3. There are 6 dots on one half of a domino and 4 on the other half. How many dots are there on the domino? 10

A DOMINO GAME

In playing the domino game, choose one of your class as leader. Each of the other pupils has a pack of domino cards. Your leader may name any number from 3 to 10.

If he names 4, hold up the 2 and 2 domino card or the 3 and 1 card. Whoever holds up one of these cards first wins 1 point.

Play the game until all the numbers from 3 to 10 have been named. The one who has the most points wins the game.

Copy and add these numbers. Use the domino cards if you need help:

1. $2+2=?$
2. $4+1=?$
3. $3+3=?$
4. $5+5=?$
5. $5+1=?$
6. $3+4=?$
7. $4+4=?$
8. $5+4=?$
9. $3+5=?$
10. $4+2=?$
11. $2+5=?$
12. $6+2=?$
13. $4+5=?$
14. $6+3=?$
15. $4+6=?$

ANOTHER WAY OF WRITING NUMBERS TO ADD

It is easy to add numbers when one is written under another. See how many of these additions you can make correctly:

1	1	1	1	1	1	1	1	1
1	2	3	6	4	8	7	9	5
2	3	3	2	5	2	4	2	6
3	5	2	4	2	6	2	7	2

Try to make all of these additions in thirty seconds:

2	3	4	5	6	7	8	9
1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1
2	3	4	5	6	7	8	9
2	3	4	5	1	0	2	0
2	3	4	5	0	1	0	2
0	3	4	0	5	0	0	6
3	0	0	4	0	5	6	0

Give the missing numbers. Do not use your pencil:

John: I have more money than you have, Mary.

Mary: I have 5 cents and 3 cents. That makes ? cents. How much have you, John?

John: I have 5 cents and 4 cents. That makes ? cents.

Mary: I'm going to spend a nickel for an ice cream cone and 2 pennies for candy. That will make ? cents.

John: I'm going to spend 4 cents for an apple and 2 cents for a postage stamp. That will make ? cents.

Mary: I have 3 cents in my bank and my mother is going to give me 6 cents. Then I'll have ? cents.

John: My father is going to give me 7 cents and I have 2 cents in my bank. I'll have ? cents.

USING A NUMBER CHART

0	10	20	30	40	50	60	70	80	90	A
1	11	21	31	41	51	61	71	81	91	B
2	12	22	32	42	52	62	72	82	92	C
3	13	23	33	43	53	63	73	83	93	D
4	14	24	34	44	54	64	74	84	94	E
5	15	25	35	45	55	65	75	85	95	F
6	16	26	36	46	56	66	76	86	96	G
7	17	27	37	47	57	67	77	87	97	H
8	18	28	38	48	58	68	78	88	98	I
9	19	29	39	49	59	69	79	89	99	J

1. Count by 1's to 100 by reading down each column, one after the other.

2. Count by 10's to 100. (Row A.)

3. Begin with 1 and count by 10's to 91. (Row B.)

4. Begin with 2 and count by 10's to 92. (Row C.)

5. Begin with 3, 4, 5, 6, 7, 8 and 9 and count each row by 10's.

6. Count by 2's from 2 to 100 in this way: 2, 4, 6, 8, 10.

7. Count backward by one's from 99 to 0.

8. Count backward by 2's from 98 to 0.

9. Count backward by 10's from 90 to 0.

10. Begin at any number in the last column of figures and count backward by 2's.

A BLINDFOLD GAME

Place pebbles or small pieces of chalk on a table in groups of 2, 3, 4, and 5.

Two leaders will choose sides and divide the class into two teams. Then a leader will blindfold one of his team and lead him to the table. There he will pick up the first group of objects that his hand falls on.

He must not count the objects or move them about in his hand. He must guess at once how many there are. If his guess is right his team wins a point.

Then a member of the other team has a turn. The game goes on until every one has had a chance to guess. The side having the most correct guesses wins.

PROBLEMS TO WORK WITHOUT USING A PENCIL

1. John went fishing one morning. He caught 7 perch and 3 sun fish. How many fish did he catch?

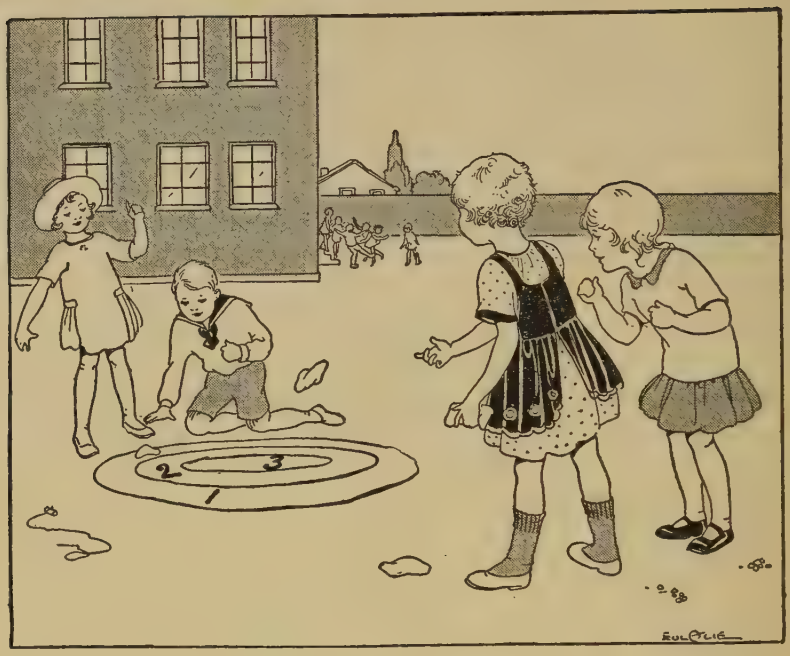
2. Dick rides with the milkman and helps him carry the bottles. This morning he carried in 6 bottles of milk and 4 bottles of cream. How many bottles was that?

3. Mary had 3 gold fish in a bowl. Her father brought her 4 more. How many had she then?

4. Fred sold 7 tickets to the baseball game and his brother sold 2. How many did they sell?

5. Betty has 4 big dolls and 5 little ones. How many dolls has she?

6. How many school days are there in a week? How many are there in two weeks?



A BEAN BAG GAME

These children are playing a bean bag game.

When you wish to play this game, tie a string to a piece of chalk and draw circles on the floor like those in the picture. Number the circles as they are numbered in the picture. Use three or four bean bags. Stand five or six steps from the circles and throw the bags, one after another.

A bag in the outer ring counts 1. A bag in the next ring counts 2, and a bag in the inner circle counts 3. If a bag does not fall in any of the rings it counts 0 or zero. Zero or 0 means **not any.**

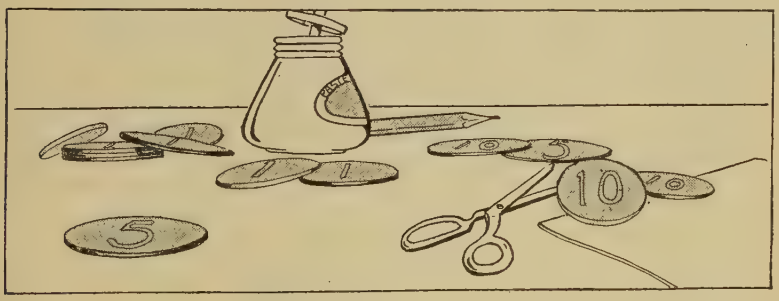
2
0
3
1
6

When Ruth's class played the bean bag game, she wrote her score on the blackboard like this.

To find how much she made, begin at the bottom and add up. Skip the 0. Think 1, 4, 6.

Copy these scores of the other children. Add each one. Be sure to skip the zeros.

John	Ray	Jane	Bob	Helen	Lucy
1	2	1	0	2	1
2	0	3	2	2	0
0	2	0	1	3	2
3	1	2	2	0	3



TOY MONEY

Make toy money out of cardboard to use in playing store. Have real coins as patterns and draw circles around them. Cut out the circles.

Write the number 1 on some of the circles. Call them 1-cent pieces or pennies.

Write the number 5 on some of the circles. Call them 5-cent pieces or nickels.

Write the number 10 on some of the circles. Call them 10-cent pieces or dimes.

PLAYING STORE

You can have lots of fun playing store and buying with your toy money.

Let one boy be storekeeper and sell to the rest of the class.

The storekeeper must make change. If you give a dime in paying for a 6-cent purchase, the storekeeper must take pennies from the cash box and say, "seven, eight, nine, ten," and give you four cents. If you give a dime in paying for a 7-cent purchase, he must say "eight, nine, ten," and give you three cents.

PRICE LIST

Animal crackers . .	5¢	Cookies	8¢
Soda crackers . . .	6¢	Orange	4¢
Campbell's soup . .	9¢	Bread	7¢
Apple	2¢	Yeast cake	3¢

Buy:

1. A package of animal crackers.
2. A can of Campbell's soup.
3. A box of soda crackers.
4. A package of cookies.
5. A loaf of bread.
6. A yeast cake.
7. An apple.
8. An orange.

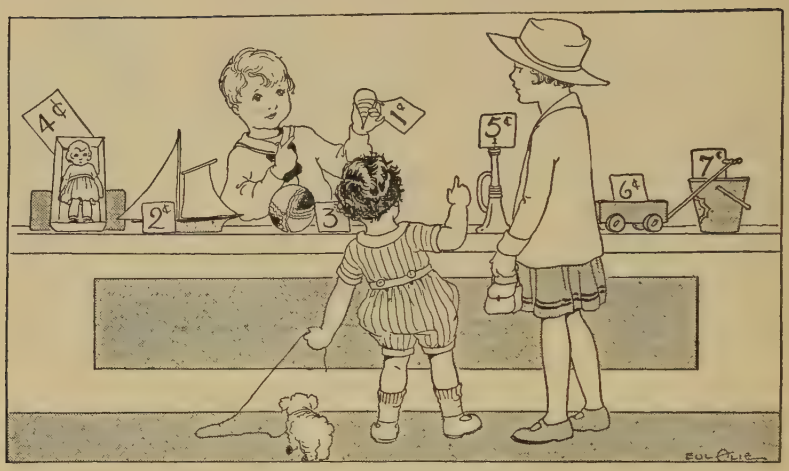
UNITED STATES MONEY

Learn the name of each piece of money.

One dollar equals 2 half dollars.
One dollar equals 4 quarter dollars.
One dollar equals 10 dimes.
One dollar equals 100 cents.
One-half dollar equals 50 cents.
One-quarter dollar equals 25 cents.
One dime equals 10 cents.
One dime equals 2 nickels.
One nickel equals 5 cents.
The sign for dollar or dollars is $.
The signs for cent or cents are ¢, c. or ct.
1 cent is written 1¢, or 1c. or 1 ct.
One hundred cents is written 100¢ or $1.
Fifty dollars is written $50.

John saw these prices in a store. Read them:

75¢ 30¢ 50c. 85c. 58 ct. 73 ct.



THE TOY STORE

Tell how much you would have to pay at the Toy Store for:

1. A top and a boat.
2. A boat and a ball.
3. A doll and a boat.
4. A doll and a top.
5. A horn and a ball.
6. A horn and a boat.
7. A doll and a ball.
8. A horn and a top.
9. A cart and a boat.
10. A pail and a boat.

Add and give the sums:

1. 3¢ and 2¢ are ? ¢
2. 4¢ and 4¢ are ? ¢
3. 5¢ and 2¢ are ? ¢
4. 4¢ and 3¢ are ? ¢
5. 4¢ and 2¢ are ? ¢
6. 6¢ and 3¢ are ? ¢
7. $5¢ + 2¢ = ?\ ¢$
8. $3¢ + 3¢ = ?\ ¢$
9. $5¢ + 3¢ = ?\ ¢$
10. $6¢ + 2¢ = ?\ ¢$
11. $5¢ + 5¢ = ?\ ¢$
12. $4¢ + 6¢ = ?\ ¢$

Read and give the answers:

1. A nickel and 2 cents = ? cents.
2. A nickel and 4 cents = ? cents.
3. A nickel and 5 cents = ? cents.
4. Two nickels equal ? dimes.
5. Four nickels equal ? dimes.
6. Count by 10's to 50. How many dimes are there in 50 cents?
7. Count by 10's to 100. How many dimes are there in one dollar?
8. How many pennies are there in one dollar?
9. Count by 5's to 25. How many nickels are there in a quarter of a dollar?
10. How many cents are there in a dime?
11. How many cents are there in a nickel and a dime?
12. How many cents are there in 3 nickels?
13. How many nickels are there in 2 dimes?
14. How many cents are there in 2 dimes?

Read and give the missing numbers:

1. One dime = ? ¢
2. Two dimes = ? ¢
3. Three dimes = ? ¢
4. Four dimes = ? ¢
5. Five dimes = ? ¢
6. Six dimes = ? ¢
7. Seven dimes = ? ¢
8. Eight dimes = ? ¢
9. Nine dimes = ? ¢
10. Ten dimes = ? ¢

SUMS TO LEARN

Here are the numbers whose sums are ten. Study these numbers and their sums. Then try to name them without looking in the book.

5	4	3	2	1	6	7	8	9
5	6	7	8	9	4	3	2	1
10	10	10	10	10	10	10	10	10

REVIEW THESE THREE MANY TIMES

6	7	3
4	3	7
10	10	10

I can add two numbers to make 10.

1. One number is 6. The other is ? $6 + ? = 10$
2. One number is 3. The other is ? $3 + ? = 10$
3. One number is 8. The other is ? $8 + ? = 10$
4. One number is 1. The other is ? $1 + ? = 10$
5. One number is 5. The other is ? $5 + ? = 10$

Study these numbers and their sums:

6	6	6	7	7	7	8	8	8
4	14	24	3	13	23	2	12	22
10	20	30	10	20	30	10	20	30

1	1	1	31	41	51	65	75	85
9	19	29	9	9	9	5	5	5
10	20	30	40	50	60	70	80	90

Give the answers as quickly as you can. Do not use a pencil.

1.	5	15	25	35	45	16	28	17
	5	5	5	5	5	4	2	3
2.	6	3	8	9	5	7	4	2
	14	27	12	11	25	13	36	18
3.	5	5	6	6	8	8	9	7
	10	20	30	10	40	20	30	40

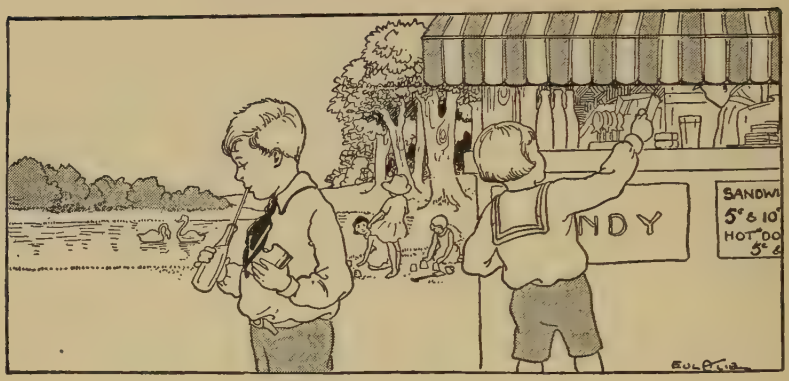
ADDING NUMBERS

Nancy has a bag of gum drops. There are 7 red ones, 5 green ones, 5 yellow ones, 5 black ones and 5 white ones. How many are in the bag? We can find out by adding 7, 5, 5, 5, and 5.

7 5 5 5 5 27 **sum**	Write the figures in a column. Begin at the bottom and think 10, 15, 20, 27. Write 27, the answer, below. The answer in addition is called the **sum.** 27 is the sum of the numbers in the column.

Add without using your pencil:

3	5	4	9	7	4	2
7	5	6	1	3	6	8
4	2	6	5	8	3	9
6	8	4	5	2	7	1



A DAY IN THE PARK

1. Fifteen boys and 5 girls went to the park. How many children went?

2. John and Henry each paid 5 cents carfare. How much was that?

3. One boy spent 5 cents for a balloon and 25 cents for a boat ride. How much did he spend?

4. The children counted 5 large and 35 small swans on the lake. How many swans did they count?

5. Some of the children made sand cakes. They made 24 small ones and 6 large ones. How many did they make?

6. Mary made 17 cakes and Jane made 3. How many did the two girls make?

7. Bob spent 10 cents for a sandwich and 5 cents for ginger ale. How much did his lunch cost?

8. Dick bought a piece of cake for 2 cents and milk for 8 cents. What did he spend?

Add these columns from the bottom to the top:

1.	5	9	7	7	6	8	9
	5	5	5	5	5	5	5
		5	5	5	5	5	5
				5	5	5	5
				5	5	5	5
						5	5
						5	5

2.	5	1	5	1	1	8	1
	5	8	5	7	4	2	9
	3	5	6	4	3	8	2
	7	5	4	6	7	2	8
	4	2	9	1	2	7	3
	6	8	1	9	8	3	7

ADDITION WITHOUT CARRYING

Jack, Dick and Harry are playing marbles. Jack has 14, Dick has 20 and Harry has 24. How many marbles have the three boys?

We can find out by adding 14, 20 and 24.

14 20 24 58	We first write the numbers to be added in columns. Think 4, 8. Write 8. Think 2, 4, 5. Write 5. The three boys have 58 marbles.

ADDITION WITH CARRYING

John saved 55 cents one week, 54 cents the next week, and 46 cents the next week. How much did he save in the three weeks?

We can find out how much John saved by adding 55 cents, 54 cents and 46 cents.

	We first write the numbers in columns, then add beginning with the right-hand column.
55¢	
54¢	Think 10, 15. Write 5 under the right-hand column; carry the 1 of the 15 to the next column. Add it to the bottom figure 4. Think 5, 10, 15. Write 15.
46¢	
155¢	John saved 155¢.

We separate dollars and cents by the use of a dot (.), called a *decimal point.*

155 cents is written \$1.55.

55 cents can be written \$0.55 or \$.55.

5 cents can be written \$0.05 or \$.05.

Copy and add from the bottom up:

1.	2.	3.	4.	5.	6.	7.
95	91	90	93	86	39	75
15	58	15	18	27	72	34
95	42	85	92	93	98	96

8.	9.	10.	11.	12.	13.	14.
33	77	15	29	80	27	41
75	32	94	18	21	85	69
35	18	36	72	99	35	76
73	91	76	65	13	74	34
87	89	84	25	87	86	80

LEARNING TO SUBTRACT

Fred wants to buy a toy boat that costs 10 cents. He has 2 cents. How many more cents does he need?

This is the way to find out:

$$\begin{array}{r} 10 \\ -2 \\ \hline 8 \end{array}$$

Write the numbers 10 and 2 as they are shown here. Then ask yourself, two and how many are ten?

2 and 8 are 10.

Write the 8 below the line.

Fred needs 8 cents more.

When we find how many more 10 cents are than 2 cents, we are *subtracting*.

The sign of subtraction is —. It is read *minus*.

The answer in subtraction is called the *difference* or *remainder*.

Both of these examples tell you to subtract. $10 - 2 =$ $\begin{array}{r} 10 \\ -2 \\ \hline \end{array}$

Read across the page giving the number you must add to the lower number to make it equal the upper number:

$\begin{array}{r} 3 \\ -2 \\ \hline \end{array}$	$\begin{array}{r} 5 \\ -3 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ -5 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ -4 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -7 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ -2 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ -5 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -8 \\ \hline \end{array}$
$\begin{array}{r} 6 \\ -3 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -6 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -5 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ -3 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ -4 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ -4 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -2 \\ \hline \end{array}$
$\begin{array}{r} 4 \\ -2 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -3 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -2 \\ \hline \end{array}$	$\begin{array}{r} 8 \\ -1 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -1 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -5 \\ \hline \end{array}$	$\begin{array}{r} 9 \\ -7 \\ \hline \end{array}$	$\begin{array}{r} 7 \\ -6 \\ \hline \end{array}$

1. Give the missing numbers. Say "9 and 1 are 10."

9	7	2	4	5	8	6	3	1
?	?	?	?	?	?	?	?	?
10	10	10	10	10	10	10	10	10

2. Now give the missing numbers only, in exercise 1.

3. Subtract these numbers from 10. Say, "9 and 1 are 10."

10	10	10	10	10	10	10	10	10
−9	−2	−4	−7	−5	−8	−6	−3	−1

4. Give the answers only, in exercise 3.

5. A dime is how much more than 3 cents?

6. Four cents is how much less than a dime?

7. Seven cents and how many cents make a dime?

8. A dime is how much more than 2 cents?

NUMBERS EASY TO SUBTRACT

1.	10	10	10	10	10	10	10	10
	−9	−7	−6	−4	−2	−8	−3	−5
2.	9	9	9	9	9	9	9	9
	−5	−4	−6	−3	−8	−2	−1	−7
3.	8	8	8	8	8	8	8	6
	−5	−3	−4	−2	−7	−6	−1	−4
4.	7	7	7	7	7	7	6	4
	−5	−2	−4	−1	−6	−3	−3	−0

ON THE FARM

1. During vacation Dick and Polly spent 31 days in July and 9 days in August on their grandfather's farm. How many days were they there?

2. Dick is 9 years old and Polly is 11. Give the sum of their ages.

3. One day Polly found 9 eggs. The next day she found 21. How many did she find in all?

4. There were 41 chickens and 9 ducks to be fed. How many were there in all?

5. There were 10 boys and 8 girls at the farm. How many more boys than girls were there?

6. Dick had 10 rides on the hay wagon. Polly had only 7. How many more rides did Dick have than Polly?

7. Grandma gave the children 9 cookies. When 5 were eaten how many were left?

8. The boys caught 20 fish but 9 of them were too small to cook. How many were large enough to cook?

Give the missing numbers in these additions:

1.	1	11	21	31	41	9	9	9
	9	9	9	9	9	11	21	31
	?	?	?	?	?	?	?	?
2.	9	9	9	9	?	?	?	?
	?	?	?	?	9	9	9	9
	10	30	50	40	20	40	10	30

Begin at the bottom and add:

5	9	9	6	82	56
9	1	1	9	75	89
1	9	5	1	15	11
9	1	5	5	21	19
1	9	5	5	69	21
	1	5	1	45	85
			9	75	75

Give the missing numbers in these additions:

1.	8	8	8	8	8	8	8	8
	2	12	22	32	?	?	?	?
	?	?	?	?	10	20	30	40
2.	7	27	37	17	37	27	17	7
	3	3	3	3	?	?	?	?
	?	?	?	?	40	30	20	10
3.	6	16	36	26	?	?	?	?
	4	4	4	4	26	16	6	36
	?	?	?	?	30	20	10	40

PROBLEMS

1. Fred bought a dozen oranges for 27 cents and spent 3 cents for candy. How much did he pay for both?

2. Peggy set out 17 colored pansy plants and 3 white pansy plants in her garden. How many plants did she set out?

3. Jennie gathered 16 eggs one day and 4 eggs the next day. How many eggs did she gather in the two days?

4. John's father drove 46 miles in the morning and 4 miles after lunch. How many miles did he drive?

Begin at the bottom and add:

1.	2.	3.	4.	5.	6.	7.
3	6	5	7	4	87	16
7	9	4	6	5	26	38
3	1	6	4	5	14	72
7	8	6	4	4	98	21
3	2	4	6	6	52	89
7	7	6	4	9	12	63
—	3	4	6	1	18	17

Subtract. Be sure you know the answers:

10	10	10	10	10	10	10	10	10
−9	−4	−8	−7	−6	−3	−5	−1	−2

REVIEW THESE THREE MANY TIMES

10	10	10
−8	−3	−9
2	7	1

LET'S PLAY CIRCUS!

Billy's mother says we can play circus in the barn. We'll ask all the children in Billy's class and my class to come. Let's see.

1. There are 27 in Billy's class and 13 in mine. How many will that be?

2. Bob is going to get 13 boxes from his father's store. Harry can get 7 old chairs and Alice can get 3 stools. How many seats will we have?

3. If 30 people come and we have 23 seats, how many people will not have seats?

4. We have to buy crepe paper to make clown suits. Charlie has 31¢, Bob has 15¢ and Alice's mother gave her 61¢. How much money will we have?

5. To trim the barn, we will need 14 yards of red paper, 16 yards of white paper and 10 yards of blue. How many yards will that be in all?

6. We are going to have a parade in the morning. There will be 13 children on roller skates, 7 boys on scooters, 15 boys with carts and 5 children in the band. How many will there be in the parade?

7. Six children are going to be clowns, 4 will be animals, 2 will be ring masters and 8 will be in the band. How many will there be in the circus?

UNITS AND TENS

In 23 cents there are 2 dimes and 3 cents.

Tell how many dimes and cents there are in each of these:

1. In 34 cents there are ? dimes and ? cents.
2. In 56 cents there are ? dimes and ? cents.
3. In 75 cents there are ? dimes and ? cents.
4. In 89 cents there are ? dimes and ? cents.

In 12 there are 1 **ten** and 2 ones. Two ones mean two **units.**

Tell how many tens and units there are in each of these:

1. In 25 there are ? tens and ? units.
2. In 47 there are ? tens and ? units.
3. In 92 there are ? tens and ? units.

In two-figure numbers the right-hand figure is called **units,** and the left-hand figure is called **tens.**

Tell how many tens and units there are in each of these:

14	23	64	42	84	91	17
21	31	52	27	73	18	24
16	45	33	19	62	46	85

Write the number that is made of:

7 tens and 1 unit.
8 tens and 5 units.
6 tens and 0 units.
3 tens and 3 units.
1 ten and 9 units.
9 tens and 0 units.

CHICAGO BOARD OF EDUCATION
BENNETT SCHOOL

ADDING UNITS AND TENS

There are 24 pupils in one room and 35 in another. How many pupils are there in both rooms?

We can find how many pupils there are by adding 24 pupils and 35 pupils.

24 pupils	First we add the units and then the
35 pupils	tens.
59 pupils	There are 59 pupils in both rooms.

Copy and add:

1.	24 31	2.	58 21	3.	64 25	4.	45 44	5.	72 27	6.	84 15
7.	36 43	8.	74 14	9.	31 36	10.	63 33	11.	81 18	12.	54 45
13.	42 22	14.	60 39	15.	49 40	16.	77 22	17.	86 13	18.	38 61
19.	13 34 52	20.	10 45 43	21.	23 6 51	22.	21 15 61	23.	6 50 23	24.	41 10 8

Write in columns and add:

1. $14 + 15 + 10$
2. $41 + 34 + 14 + 10$
3. $20 + 6 + 13$
4. $16 + 41 + 22$
5. $43 + 3 + 3$
6. $40 + 42 + 7$

READING AND WRITING NUMBERS—HUNDREDS

The largest number we can write with two figures is 99. The next number after 99 is one hundred. One hundred is written 100. Two hundred is written 200. One hundred one is written 101.

Read each of these numbers:

171	119	180	199	175
300	400	600	800	900
206	475	480	808	909
200	500	700	100	999

5 = 5 **units** 70 = 7 **tens** 200 = 2 **hundreds** 275	We can make 275 by adding 5, 70 and 200. In every three-figure number, the right-hand figure is **units,** the next is **tens** and the next is **hundreds.**

Read each of these numbers. Then tell how many units, tens and hundreds there are in each:

179	435	245	841	911
380	519	689	723	309

Write each of these numbers in figures:

One hundred twenty.

Two hundred forty-six.

Four hundred eighteen.

Three hundred seven.

Six hundred fifty-one.

Eight hundred nine.

See how many different numbers you can make from 4, 6 and 3. Arrange them in order with the smallest first and the largest last.

Try to give all these sums in one minute:

1.	1	2	0	5	4	6	3
	5	4	6	1	2	0	3
2.	6	4	5	7	1	3	2
	1	3	2	0	6	4	5
3.	7	5	6	1	3	2	4
	1	3	2	7	5	6	4
4.	1	3	4	2	8	6	5
	8	6	5	7	1	3	4

The subtraction sign is not used in these examples. Subtract without copying:

1.	6	8	9	5	7	4	9
	3	6	4	1	4	2	7
2.	6	8	7	6	8	9	8
	2	4	2	1	3	6	5
3.	9	5	4	6	4	8	7
	1	4	1	5	3	2	6
4.	9	3	7	8	9	7	9
	3	1	5	7	5	1	8

SUMS TO LEARN

The same number is used twice in each of these additions. They are called the doubles. Study them carefully and remember their sums.

9	8	7	6	5	4	3	2	1
9	8	7	6	5	4	3	2	1
18	16	14	12	10	8	6	4	2

Give the missing numbers:

$2 + ? = 4$ $\quad 4 + ? = 8$ $\quad 6 + ? = 12$ $\quad 8 + ? = 16$

$3 + ? = 6$ $\quad 5 + ? = 10$ $\quad 7 + ? = 14$ $\quad 9 + ? = 18$

Add without copying:

4	8	6	3	5	8	7	1
2	4	0	8	6	4	4	2
1	2	3	6	7	0	8	9
1	2	3	6	7	4	8	9

Add. Remember that we are using the doubles:

1.	9	9		8	8		7	7		6	6
	19	29		18	38		17	27		16	36
2.	4	4		3	3		2	2		1	41
	14	24		13	43		12	52		11	1

PROBLEMS

1. Fred's father sold 16 barrels of Baldwin apples and 6 barrels of Greenings. How many barrels of apples did he sell in all?

2. Robert sold 21 papers one day and 31 the next day. How many papers did he sell in the two days?

3. Rose spent 8 cents for a trolley ride and 28 cents for lunch. How much did she spend in all?

4. Jenny picked 19 roses one day and 9 roses the next day. How many did she pick in the two days?

1. Add 9 to 39, 49, 69, 79.
2. Add 8 to 28, 48, 58, 88.
3. Add 7 to 27, 37, 47, 67.
4. Add 6 to 26, 36, 56, 86.
5. Add 4 to 34, 54, 74, 94.
6. Add 3 to 23, 33, 63, 83.

Add without copying:

2	5	9	2	2	8	5	1
6	5	9	9	2	2	5	3
8	6	4	9	4	6	8	1
4	7	8	5	3	2	6	8
4	7	8	5	3	2	6	8

Copy and add from the bottom up:

1.	2.	3.	4.	5.	6.
58	64	78	94	64	55
24	82	32	42	80	88
48	49	74	66	48	66
28	29	24	96	28	46

Copy in columns and add:

1. $86 + 6 + 45 + 25$
2. $84 + 8 + 69 + 39$
3. $97 + 67 + 42 + 88$
4. $78 + 26 + 82 + 92$

Subtract. Be sure you know the answers.

18	14	12	16	4	10	6	2	8
9	7	6	8	2	5	3	1	4

REVIEW THESE THREE MANY TIMES

18	16	14
−9	−8	−7
9	8	7

Find the missing numbers. Do not use a pencil:

14	16	4	18	10	8	6	2	12
?	?	?	?	?	?	?	?	?
7	8	2	9	5	4	3	1	6

PROBLEMS

1. Elizabeth put $16 in the bank and drew out $8. How much had she left in the bank?

2. Walter started to ride 14 miles on his bicycle. After he had ridden 7 miles, how far had he yet to go?

3. A baseball team played 12 games and lost 6 games. How many games did the team win?

Read the following and give the answers:

8 − 4 = ?	2 − 1 = ?	12 − 6 = ?
18 − 9 = ?	6 − 3 = ?	16 − 8 = ?
10 − 5 = ?	4 − 2 = ?	14 − 7 = ?

DRILL IN ADDITION

Add without copying. Use a folded answer paper:

1.

9	5	2	7	6	1	3	7
8	4	3	2	4	6	5	4
2	6	7	8	6	4	5	6
4	9	6	7	7	6	6	4
8	1	4	3	3	4	4	6
4	8	9	4	2	2	6	8
4	2	1	6	8	8	4	2
6	8	9	5	1	8	2	8
4	2	1	5	9	2	8	2

2.

2	2	4	9	4	7	4	3
4	8	6	1	6	3	2	7
6	7	8	3	9	6	8	4
2	3	2	7	1	4	4	8
9	6	7	3	9	6	8	9
9	4	3	7	1	4	8	9

3.

4	9	4	3	4	3	6	9
6	4	6	7	6	7	4	1
3	6	7	8	4	8	8	9
7	1	3	2	6	6	2	8
6	9	2	6	8	8	6	2
7	7	9	7	6	9	7	5
7	3	9	7	6	9	7	5

DRILL IN ADDITION

Add without copying:

1.

8	2	4	4	3	8	6	3
2	4	8	4	4	4	3	3
4	4	6	8	3	3	3	8
4	2	6	6	3	3	2	6
2	4	8	8	4	2	4	8
9	7	6	9	3	9	7	9
9	7	6	9	3	9	7	9

2.

3	4	3	3	2	3	4	8
2	2	3	2	4	2	2	4
4	2	2	4	2	4	6	4
4	8	4	4	6	4	6	6
2	6	2	2	8	4	8	2
4	3	1	9	9	8	6	1
4	3	1	9	9	8	6	1

3.

49	39	76	82	84	24
78	11	72	47	92	67
11	68	22	74	16	87
34	68	98	18	46	42
38	52	96	89	78	24
29	17	43	48	16	67
49	13	33	11	36	37

SUMS TO LEARN

Here are the numbers whose sums are nine. Study these numbers and their sums. Then try to name them without looking in the book.

1	3	4	2	8	6	5	7	9
8	6	5	7	1	3	4	2	0
9	9	9	9	9	9	9	9	9

REVIEW THESE THREE MANY TIMES

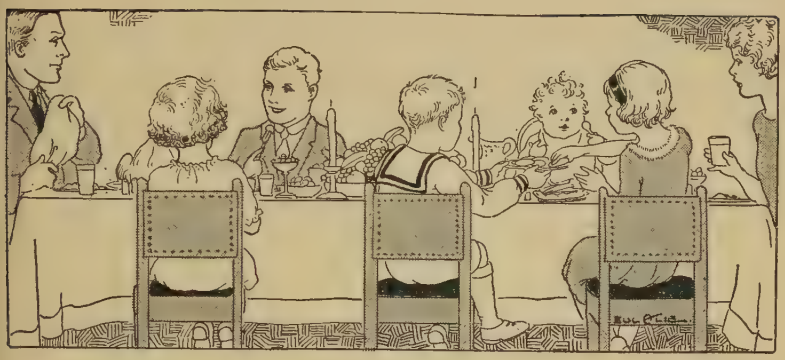
3	7	0
6	2	9
9	9	9

I can add two numbers to make 9.

1. One number is 4. The other is ? $4 + ? = 9$
2. One number is 8. The other is ? $8 + ? = 9$
3. One number is 6. The other is ? $6 + ? = 9$
4. One number is 2. The other is ? $2 + ? = 9$

Add without copying:

1.	1	3	8	4	6	2	9
	48	26	31	15	13	37	10
2.	2	4	5	7	6	3	9
	57	45	24	12	33	46	30



BUYING FOR THE THANKSGIVING DINNER

PRICE LIST

Grapefruit	9¢	Cheese, a package	8¢
Celery, a bunch . .	8¢	Almonds, a pound	27¢
Cranberries, a pound	19¢	Walnuts, a pound	48¢
Bottle of olives . . .	28¢	Oranges, a dozen .	40¢
Brazil nuts, a pound	37¢	Bananas, a dozen .	38¢

1. How much will a pound of cranberries and a dozen oranges cost?

2. A pound of walnuts will cost how much more than a dozen bananas?

3. A dozen bananas will cost how much more than a bunch of celery?

4. Find the cost of a dozen oranges and a bottle of olives.

5. How much more will you pay for a pound of cranberries than for a package of cheese?

Give the sums. Do not use a pencil:

$16 + 3 = ?$ $27 + 2 = ?$ $45 + 4 = ?$ $33 + 6 = ?$

$7 + 32 = ?$ $14 + 5 = ?$ $5 + 24 = ?$ $9 + 40 = ?$

Add without copying:

4	9	3	8	6	9	7	8
5	1	6	9	3	2	2	9
1	9	2	0	1	7	9	1
5	2	9	6	5	1	1	9
4	7	9	3	4	9	8	9

Copy and add:

59	90	92	99	59	89	85
20	29	18	10	17	51	81
91	96	92	92	96	52	14
88	83	88	87	86	97	85

Subtract. Be sure you know the answers.

9	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**	**9**
3	**4**	**6**	**2**	**5**	**7**	**0**	**1**	**8**	**9**

REVIEW THESE THREE MANY TIMES

9	9	9
−2	−6	−4
7	3	5

Subtract without copying:

39	49	69	29	79	59	39
3	4	5	6	2	7	9

SUBTRACTION WITHOUT CHANGES

A reader cost 89 cents and an arithmetic 46 cents. How much more does the reader cost than the arithmetic?

We can find out by subtracting 46 cents from 89 cents.

89 46 43	Think 6 and 3 are 9. Write 3. Think 4 and 4 are 8. Write 4. The reader cost 43¢ more than the arithmetic.

Copy and subtract:

1.	45¢ 34	2.	82 41	3.	69 32	4.	84 44	5.	87 71	6.	48 27	7.	96 15
8.	999 722	9.	999 682	10.	999 257	11.	999 706	12.	999 879	13.	999 800		
14.	109 87	15.	109 64	16.	109 25	17.	109 90	18.	109 37	19.	109 32		

PROBLEMS

1. Ralph bought a knife for 99 cents and a hammer for 47 cents. How much less did the hammer cost than the knife?

2. A man owed $79 and paid $60. How much did he still owe?

3. Ralph weighs 109 pounds and his sister weighs 86 pounds. How much more does Ralph weigh than his sister?

RIDING ON A MERRY-GO-ROUND

Fred has a small merry-go-round in his yard and he is raising money for the Boy Scout Camp by charging his playmates 2 cents a ride.

By adding the columns of 2's we find that the cost of riding:

	2¢	2¢	2¢	2¢	2¢	2¢	2¢	2¢	2¢	2¢
1 time is	2¢	2	2	2	2	2	2	2	2	2
2 times is	.	4¢	2	2	2	2	2	2	2	2
3 times is	.	.	6¢	2	2	2	2	2	2	2
4 times is	.	.	.	8¢	2	2	2	2	2	2
5 times is	.	.	.	.	10¢	2	2	2	2	2
6 times is	.	.	.	.	.	12¢	2	2	2	2
7 times is	.	.	.	.	.	.	14¢	2	2	2
8 times is	.	.	.	.	.	.	.	16¢	2	2
9 times is	.	.	.	.	.	.	.	.	18¢	2
10 times is	.	.	.	.	.	.	.	.	.	20¢

Instead of adding three 2's to find the cost of 3 rides, we may think 3 times 2 = 6. We may write 3 times 2 in this way: $3 \times 2 = 6$. This is *multiplying*.

The sign of *multiplication* is $\times$. It means *times*.

The answer in multiplication is called the *product*.

At 2 cents each, 1 stamp costs $1 \times 2¢$ or $2¢$.

2 stamps cost $2 \times 2¢ = ?$
3 stamps cost $3 \times 2¢ = ?$
4 stamps cost $4 \times 2¢ = ?$
5 stamps cost $5 \times 2¢ = ?$
6 stamps cost $6 \times 2¢ = ?$
7 stamps cost $7 \times 2¢ = ?$
8 stamps cost $8 \times 2¢ = ?$
9 stamps cost $9 \times 2¢ = ?$
10 stamps cost $10 \times 2¢ = ?$

THE TABLE OF TWOS

$1 \times 2 = 2$	$6 \times 2 = 12$
$2 \times 2 = 4$	$7 \times 2 = 14$
$3 \times 2 = 6$	$8 \times 2 = 16$
$4 \times 2 = 8$	$9 \times 2 = 18$
$5 \times 2 = 10$	$10 \times 2 = 20$

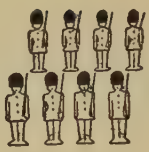
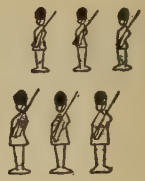
REVIEW THESE MANY TIMES

$0 \times 2 = 0$ **$2 \times 0 = 0$**

THE WHEEL DRILL

It will be easy to learn the multiplication tables, if you use this wheel to help you. Change the number in the center of the wheel for each new table.

When you practice on the wheel, multiply the number at the center by each of the numbers around the wheel. Go around the wheel first in one direction and then in the other. Then multiply the numbers around the wheel by the number at the center.

Four 2's	Two 4's	Three 2's	Two 3's
			
$4 \times 2 = 8$	$2 \times 4 = 8$	$3 \times 2 = 6$	$2 \times 3 = 6$

Add:

4	5	6	7	8	9	10
4	5	6	7	8	9	10

Give the answers:

Two 5's = ? Two 6's = ? Two 7's = ?

Two 8's = ? Two 9's = ?

Give the products:

$5 \times 2 = ?$	$2 \times 5 = ?$	$6 \times 2 = ?$	$2 \times 6 = ?$
$8 \times 2 = ?$	$2 \times 8 = ?$	$9 \times 2 = ?$	$2 \times 9 = ?$
$10 \times 2 = ?$	$2 \times 10 = ?$	$7 \times 2 = ?$	$2 \times 7 = ?$

How much must I pay for:

Five 2-cent tarts?	Two 7-cent nut bars?
Four 2-cent marbles?	Two 4-cent pears?
Seven 2-cent cookies?	Two 9-cent cakes?
Nine 2-cent apples?	Two 5-cent bananas?
Six 2-cent pencils?	Two 3-cent paper dolls?
Eight 2-cent candies?	Two 8-cent cream puffs?
Three 2-cent peaches?	Two 6-cent oranges?

SUMS TO LEARN

Here are the numbers whose sums are eight. Study these numbers and their sums. Then try to name them without looking in the book.

7	5	6	1	3	2	8	4
1	3	2	7	5	6	0	4
8	8	8	8	8	8	8	8

REVIEW THESE THREE MANY TIMES

6	3	5
2	5	3
8	8	8

I know two numbers that can be added to make 8.

1. One number is 3. The other is ? $3 + ? = 8$.
2. One number is 7. The other is ? $7 + ? = 8$.
3. One number is 4. The other is ? $4 + ? = 8$.
4. One number is 6. The other is ? $6 + ? = 8$.

Add without copying:

1.	7	1	5	2	6	8	3
	11	27	13	26	12	30	15
2.	3	2	7	5	0	4	0
	55	46	31	23	28	34	18

Begin at the bottom and add. Write the sums only:

2	2	8	7	2	6	1	8
8	6	6	1	8	0	7	2
2	0	8	2	2	2	2	8
1	7	0	3	9	4	5	6
7	3	8	5	9	6	3	2

Copy and try to add all of these examples in three minutes:

1.	2.	3.	4.	5.	6.	7.	8.
24	28	86	87	65	82	87	97
28	52	96	22	83	28	92	31
82	34	53	81	68	84	19	80
66	86	27	77	12	74	89	79

Subtract. Be sure you know the answers:

8	8	8	8	8	8	8	8	8
4	3	6	5	0	7	2	1	8

REVIEW THESE THREE MANY TIMES

8	8	8
−5	−3	−6
3	5	2

Subtract without copying:

888	888	888	8888	8989
168	204	840	4365	7314

USING WHAT WE HAVE LEARNED

1. Harry's mother bought a watermelon for 99 cents and some bananas for 38 cents. How much more did the watermelon cost than the bananas?

2. Eleven boys from John's school are playing football and 48 boys are watching the team. How many boys is that?

3. The teacher had 59 readers. She gave 44 of them to the children. How many were left?

4. Charles rode his bicycle 14 miles in the morning and 29 miles in the afternoon. How much farther did he ride in the afternoon than in the morning?

5. Roger paid 15 cents for a box of crackers and 24 cents for a can of corn. How much did he pay for both?

6. Alice saved 27 cents last week and 49 cents this week. How much more has she saved this week than last week?

7. George brought his teacher 16 white roses and 13 red roses. How many roses did he bring?

8. Julia and her mother are reading a book aloud. One Saturday mother read 36 pages and Julia 13. How many pages did they read?

9. Two scout troops went on a hike together. There were 56 in one troop and 33 in another. How many boys went?

10. Make up other addition and subtraction problems about the numbers 11 and 8, 3 and 6, 2 and 7. 4 and 5 for your classmates to answer.

DRILL IN ADDITION

Add without copying:

1.

9	9	9	8	8	9	3	9
5	4	4	9	5	4	7	5
4	5	5	5	1	5	1	4
1	2	1	7	4	4	4	2
1	9	9	7	5	8	5	9
9	9	1	8	5	9	2	9
5	2	5	6	2	6	9	4
4	8	4	6	8	3	9	6

2.

4	9	5	6	1	1	5	9
8	4	4	8	7	4	4	9
7	5	2	4	8	8	1	5
1	4	8	4	6	6	9	5
2	8	2	2	8	8	4	2
7	6	2	5	3	9	8	1
1	2	6	3	5	9	8	7

3.

11	31	53	15	86	18
18	59	48	97	15	26
75	54	68	27	95	78
25	26	84	46	91	29
48	95	68	47	17	85
22	65	38	77	82	64

SUMS TO LEARN

Here are numbers whose sums are 7 or 17. Study these numbers and their sums. Then try to name them without looking in the book.

9	4	5	6	8	3	2	1	7
8	3	2	1	9	4	5	6	0
17	7	7	7	17	7	7	7	7

REVIEW THESE THREE MANY TIMES

9	8	2
8	9	5
17	17	7

I can add two numbers to make seven.

One number is 3. The other is ? $3 + ? = 7$

One number is 5. The other is ? $5 + ? = 7$

One number is 1. The other is ? $1 + ? = 7$

I can add two numbers to make 17.

One number is 8. The other is ? $8 + ? = 17$

Add without copying:

18	20	13	12	11	24	39
9	7	4	5	6	3	8

1. Add 8 to each of these: 19, 39, 59, 79.
2. Add 3 to each of these: 14, 24, 64, 84.
3. Add 2 to each of these: 15, 45, 75, 95.
4. Add 1 to each of these: 16, 76, 86, 96.
5. Add 9 to each of these: 38, 48, 68, 88.
6. Add 4 to each of these: 13, 33, 53, 73.

PROBLEMS

1. The postman put 8 valentines for Betty and 9 for her sister in the mailbox. How many did he put in the mailbox?

2. In a third grade class there are 19 boys and 8 girls. How many pupils are in this class?

3. Mary spent 29 days of her vacation at the seashore and 8 days at her grandmother's. How long was she away from home?

4. Last Hallowe'en Dick spent 7 cents for a mask, 29 cents for a pumpkin and 8 cents for candles. How much did he spend?

Begin at the bottom and add:

1.

5	7	9	6	6	9	7	8	7
2	0	4	1	0	8	3	9	8
3	3	7	3	7	3	7	3	2
4	6	3	9	5	8	0	9	2
3	1	4	8	2	9	7	8	5

2.

27	78	33	88	38	88	29
90	32	12	92	72	29	88
23	79	70	31	38	39	26
64	58	65	66	29	21	54

Subtract. Be sure you know the answers.

7	7	7	7	7	7	7	17	17
3	7	1	4	6	2	5	8	9

REVIEW THESE THREE MANY TIMES

17	17	7
−8	−9	−4
9	8	3

Copy and subtract:

1. 777	2. 777	3. 777	4. 777	5. 777	6. 777
506	173	323	14	426	164
7. 977	8. 777	9. 767	10. 980	11. 710	12. 777
564	352	350	320	210	464
13. 777	14. 897	15. 947	16. 777	17. 767	18. 767
235	536	824	735	244	437

SELLING PAPERS

Jay sells newspapers called the "Star" and the "Times." How many papers of both kinds did he sell each day?

1. On Monday, he sold 9 Stars and 8 Times.
2. On Tuesday, he sold 19 Stars and 8 Times.
3. On Wednesday, he sold 9 Stars and 18 Times.
4. On Thursday, he sold 7 Times and 22 Stars.

SUBTRACTION WITH CHANGES

Here are three ways to subtract. Ask your teacher which one to use and use only that one.

John had 57 morning papers and sold 39 of them in one hour. How many papers had he left?

We can find how many papers John had left by subtracting 39 from 57.

1

$$\begin{array}{r} 57 \\ 39 \\ \hline 18 \end{array}$$

As 7 is less than 9, we change 7 to 17.
Think 9 and 8 are 17. Write 8.
We changed 7 to 17. Now change 3 to 4, and think 4 and 1 are 5. Write 1.
John had 18 papers left.

2

$$\begin{array}{r} 57 \\ 39 \\ \hline 18 \end{array}$$

As we cannot take 9 from 7, we change 7 to 17. Think 9 from 17 = 8. Write 8.
Add 1 to 3. $1 + 3 = 4$. Think 4 from $5 = 1$. Write 1. John had 18 papers left.

3

$$\begin{array}{r} 57 \\ 39 \\ \hline 18 \end{array}$$

As we cannot take 9 from 7, we borrow 1 from 5. This leaves 4. Change 7 to 17. Think 9 from 17 = 8. Write 8. Think 3 from 4 = 1. Write 1.
John had 18 papers left.

Copy and subtract:

1.	82 36	2.	84 47	3.	97 58	4.	98 29	5.	86 18	6.	92 16
7.	68 29	8.	47 19	9.	86 38	10.	94 37	11.	87 78	12.	92 56

SUBTRACTION WITH ZEROS

Here are three ways to subtract. Ask your teacher which one to use and use only that one.

Mary had 60 cents and spent 25 cents for a book. How many cents had she left?

We can find how many cents Mary had left by subtracting 25 cents from 60 cents.

1

60	Change 0 to 10. 5 and 5 are 10. Write 5.
25	Change 2 to 3. 3 and 3 are 6. Write 3.
35	Mary had 35 cents left.

2

60	Change 0 to 10. 5 from 10 = 5. Write 5.
25	Add 1 to 2. 3 from 6 = 3. Write 3.
35	Mary had 35 cents left.

3

60	Borrow 1 from 6. This leaves 5.
25	Change 0 to 10. 5 from 10 = 5. Write 5.
35	2 from 5 = 3. Write 3.
	Mary had 35 cents left.

Copy and subtract:

1.	80	2.	80	3.	80	4.	80	5.	80	6.	80	7.	80
	45		36		24		17		52		51		73
8.	80	9.	80	10.	80	11.	90	12.	90	13.	90	14.	90
	29		48		33		15		24		42		56

SUBTRACTION PROBLEMS

1. Helen had 19 pieces of candy and gave away 4. How many pieces had she left?

2. There were 18 pencils in a box. How many were left after 7 were given out?

3. Twenty children were in a spelling match. Eight were spelled down. How many remained?

4. The milkman brought 18 bottles of milk for the second grade children. How many bottles were left after 9 bottles were used?

5. Bill has 9 cents and wants to buy a ball for 18 cents. How many more cents does he need? How did you find the number?

6. A ball costs 25 cents and a top costs 5 cents. How much more does the ball cost than the top? How did you find the difference?

7. Jennie gathered 18 eggs one day. She fell down and broke 8. How many were left?

8. Bessie is 9 years old. Her big brother is 20 years old. What is the difference in their ages? How did you find the difference?

9. Howard went out to lunch with his father. He paid 25 cents for a roast beef sandwich and 10 cents for a dish of ice cream. How much more did he pay for the sandwich than for the ice cream?

10. James should weigh 69 pounds. He weighs only 56 pounds. How much is he under weight?

11. Make some new subtraction problems for your classmates to work and explain.

THE TABLE OF FIVES

Count by 5's to 50, saying 5, 10, 15, and so on.

Add each column and give the sum. Then instead of adding two 5's to make 10, multiply and say 2 times 5 = 10.

	5	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
2 times 5 =	?	5	5	5	5	5	5	5	5
3 times 5 =		?	5	5	5	5	5	5	5
4 times 5 =			?	5	5	5	5	5	5
5 times 5 =				?	5	5	5	5	5
6 times 5 =					?	5	5	5	5
7 times 5 =						?	5	5	5
8 times 5 =							?	5	5
9 times 5 =								?	5
10 times 5 =									?

THE TABLE OF FIVES

$1 \times 5 = 5$	$6 \times 5 = 30$
$2 \times 5 = 10$	$7 \times 5 = 35$
$3 \times 5 = 15$	$8 \times 5 = 40$
$4 \times 5 = 20$	$9 \times 5 = 45$
$5 \times 5 = 25$	$10 \times 5 = 50$
$5 \times 0 = 0$	$0 \times 5 = 0$

REVIEW THESE THREE MANY TIMES

$8 \times 5 = 40$ $0 \times 5 = 0$ $9 \times 5 = 45$

THE TABLE OF TENS

Count by 10's to 100.

Count by 10's to 100 saying: 1 ten is 10; 2 tens are 20, and so on.

To go to the moving picture once costs 10 cents:

2 times cost ? cents.
3 times cost ? cents.
4 times cost ? cents.
5 times cost ? cents.
6 times cost ? cents.
7 times cost ? cents.

There are 10 dimes in one dollar. How many dimes are there in 6 dollars? In 7 dollars? In 8 dollars? In 9 dollars? In 10 dollars?

THE TABLE OF TENS

$1 \times 10 = 10$
$2 \times 10 = 20$
$3 \times 10 = 30$
$4 \times 10 = 40$
$5 \times 10 = 50$
$6 \times 10 = 60$
$7 \times 10 = 70$
$8 \times 10 = 80$
$9 \times 10 = 90$
$10 \times 10 = 100$

REVIEW THESE MANY TIMES

$0 \times 10 = 0$ $\quad$ $10 \times 0 = 0$

PROBLEMS

1. Frank paid 10¢ apiece for 8 balls. How much did they cost?

2. How much will 9 ice cream sodas cost at 10¢ each?

3. Fred has 10 dimes. How much money has he?

Tell how much these bags of popcorn cost at 5 cents each:

1. One bag costs ? ¢.
2. Two bags cost ? ¢.
3. Three bags cost ? ¢.
4. Four bags cost ? ¢.
5. Five bags cost ? ¢.
6. Six bags cost ? ¢.
7. Seven bags cost ? ¢.
8. Eight bags cost ? ¢.
9. Nine bags cost ? ¢.
10. Ten bags cost ? ¢.

Tell how much these bottles of ginger ale will cost at 10¢ a bottle:

1. One bottle costs ? ¢.
2. Two bottles cost ? ¢.
3. Three bottles cost ? ¢.
4. Four bottles cost ? ¢.
5. Five bottles cost ? ¢.
6. Six bottles cost ? ¢.
7. Seven bottles cost ? ¢.
8. Eight bottles cost ? ¢.
9. Nine bottles cost ? ¢.
10. Ten bottles cost ? ¢.

PROBLEMS

1. Betty is ordering packages of garden seeds. She orders 3 packages of pansy seeds at 5¢ a package. How much do they cost?

2. Poppy seeds are 10¢ a package. How much will 4 packages cost?

3. Daffodil bulbs are 10¢ apiece. How much will 9 cost?

4. Lettuce seeds are 5¢ a package. Six packages will cost how much?

ADDITION

Study and learn these sums because you will want to use them many times. When you think you know the answers cover the sums with paper and test yourself.

1	2	9	5	4	7	6	0	3
5	4	7	1	2	9	0	6	3
6	6	16	6	6	16	6	6	6
1	2	7	6	4	3	8	9	5
4	3	8	9	1	2	7	6	0
5	5	15	15	5	5	15	15	5
1	5	6	3	9	8	0	4	2
3	9	8	1	5	6	4	0	2
4	14	14	4	14	14	4	4	4
1	4	6	5	2	9	7	8	3
2	9	7	8	1	4	6	5	0
3	13	13	13	3	13	13	13	3
3	5	4	7	9	8	2	0	6
9	7	8	5	3	4	0	2	6
12	12	12	12	12	12	2	2	12
2	3	4	5	9	8	7	6	1
9	8	7	6	2	3	4	5	0
11	11	11	11	11	11	11	11	1

SUBTRACTION

Subtract. Be sure you know the answers because you will want to use them many times. When you think you know the answers, cover them with paper and test yourself:

6	6	6	6	6	6	6	16	16	16
1	2	5	0	3	4	6	8	7	9
5	4	1	6	3	2	0	8	9	7
5	5	5	5	5	5	15	15	15	15
3	2	1	4	0	5	7	9	6	8
2	3	4	1	5	0	8	6	9	7
4	4	4	4	4	14	14	14	14	14
3	0	2	1	4	7	5	8	9	6
1	4	2	3	0	7	9	6	5	8
3	3	3	3	13	13	13	13	13	13
1	0	3	2	9	7	8	4	6	5
2	3	0	1	4	6	5	9	7	8
2	2	2	12	12	12	12	12	12	12
1	2	0	7	3	6	9	5	8	4
1	0	2	5	9	6	3	7	4	8
1	1	11	11	11	11	11	11	11	11
1	0	3	6	7	8	2	4	9	5
0	1	8	5	4	3	9	7	2	6

Here are the 100 additions. The easiest come first. Give the answers as quickly as you can:

0	5	2	3	1	3	1	6	7	1
0	5	2	3	2	1	1	1	1	6
8	2	0	0	1	1	8	4	9	4
1	9	4	2	4	3	2	5	9	4
7	2	0	5	8	6	1	8	9	0
7	3	5	1	8	6	7	0	2	6
9	4	4	1	5	2	1	2	1	3
1	1	2	9	2	7	8	8	0	4
5	2	2	2	5	9	2	0	4	3
4	4	0	1	0	3	6	1	6	8
3	0	4	0	9	6	0	7	1	3
0	3	0	8	0	3	7	0	5	2
0	6	4	8	3	5	2	3	7	4
9	0	3	3	9	3	5	5	2	7
8	3	5	3	4	7	6	6	7	6
4	7	6	6	8	3	2	5	4	7
9	6	5	4	5	7	8	7	9	6
4	4	9	9	7	5	9	6	5	9
9	8	8	9	6	5	8	7	7	9
8	7	5	6	8	8	6	8	9	7

Here are the 100 subtractions. The easiest come first. Give the answers as quickly as you can:

0	5	3	7	1	8	3	4	5	6
0	1	2	7	1	1	3	4	3	6
4	9	9	3	5	6	5	9	6	3
2	1	9	0	4	0	2	0	1	1
2	7	6	9	4	8	4	5	5	6
1	1	5	8	1	4	0	5	0	3
4	2	10	10	6	2	7	6	7	8
3	2	1	2	2	0	0	4	2	8
10	9	11	12	8	1	8	7	7	9
5	5	2	6	0	0	7	3	5	3
7	8	10	9	8	12	10	10	9	9
6	2	7	7	6	8	6	4	4	6
8	10	10	11	14	9	7	12	11	10
3	9	3	7	7	2	4	9	5	8
11	12	11	13	8	12	11	12	16	11
3	7	6	6	5	3	9	4	8	8
12	18	11	14	15	14	15	13	13	13
5	9	4	8	8	6	6	7	5	8
13	16	15	15	13	17	14	17	16	14
9	7	7	9	4	9	5	8	9	9

REVIEW OF WHAT WE HAVE LEARNED

1. Write the even numbers from 2 to 20.

2. Write the odd numbers from 1 to 25.

3. How many cents are there in a nickel? A dime? One dollar?

4. Write the numbers whose sums are 10.

5. Write in one column two sets of numbers each of which makes 10, and find their sum.

6. Give the sums: $15+5=?$ $21+9=?$ $17+3=?$ $26+4=?$

7. Write in columns and add: $41+50+9$. $42+58+92$.

8. Write the doubles and their sums.

9. Add 9 to each of these numbers: 29, 19, 39, 49, 59.

10. Write the products:

$5\times5=?$ $10\times5=?$ $10\times2=?$ $8\times2=?$

11. Write all the numbers whose sums are 8.

12. Write all the numbers whose sums are 9.

Copy and add:

1.	2.	3.	4.	5.	6.
79	67	62	57	24	98
31	93	48	43	80	79
58	15	16	16	77	30
32	85	74	34	23	91

Copy and subtract:

1.	2.	3.	4.	5.
798	890	1497	990	887
379	483	738	258	259

THIRD GRADE

FIRST HALF

READING AND WRITING NUMBERS—THOUSANDS

The largest number that we can write with three figures is 999. The next number after 999 is one thousand, which is written 1000. It is easier to read thousands when a comma is written between the hundreds and thousands: 3,000. Three thousand four hundred may be written 3,400.

1. Read: 6,000, 3,800, 1,492, 1,776, 1,925, 5,432.

2. Write each of these numbers in figures:

Two thousand. Six thousand, two hundred. Four thousand, five.

Write five numbers using the figures 2, 5, 7, 9, 3. Which is the largest? Which is the smallest?

9 dollars is written $9.

7 dollars and 25 cents is written $7.25.

5 dollars and 10 cents is written $5.10.

8 dollars and 2 cents is written $8.02.

The dot between dollars and cents is called a *decimal point.*

Read: $99 $9.09 $420.25 $999.99 $3001.01.

Write in figures and use the dollar sign:

Twelve dollars and forty-nine cents. Thirty-six dollars and fifty cents. Eighty dollars and eighty cents.

102 cents is written $1.02. 2 cents is written $.02.

Write as dollars and cents: 129¢; 530¢; 303¢.

ROMAN NUMERALS

The numbers on a clock show the hours.

The numbers on some clocks are written in this way:

1 2 3 4 5 6 7 8 9 10 11 12

The numbers on other clocks are written in this way:

I II III IIII V VI VII VIII IX X XI XII

When letters stand for numbers they are called *Roman numerals,* because the Romans used letters instead of figures.

I = 1	XI = X + I = 11
II = 2	XII = X + II = 12
III = 3	XIII = X + III = 13
IV = V − I = 4	XIV = X + IV = 14
V = 5	XV = X + V = 15
VI = V + I = 6	XVI = X + VI = 16
VII = V + II = 7	XVII = X + VII = 17
VIII = V + III = 8	XVIII = X + VIII = 18
IX = X − I = 9	XIX = X + IX = 19
X = 10	XX = X + X = 20

Write these numbers in Roman numerals:

7, 4, 11, 19, 17, 20, 8, 9, 12, 14, 13, 16.

Write the Roman numerals from one to twenty.

HOW CLOCKS TELL TIME

In telling time the short hand of a clock tells the hours. It is called the *hour hand*. The long hand tells the minutes. It is called the *minute hand*.

At 12 o'clock both hands point to 12.

At 2 o'clock the short hand points to 2, and the long hand points to 12.

When the long hand points to 6 and the short hand is half way between two numbers, it is half past the first of the two numbers.

Where are the hands at 3 o'clock? At 4? At 6? At half past 3? At half past 5?

The long hand goes around the face of the clock in one hour. It takes the short hand 12 hours to go around the face of the clock.

It takes the long hand five minutes to go from one number to the next. It takes the short hand one hour to go from one number to the next.

When the long hand points to 2, it is how many minutes after the hour? How many minutes after the hour is it when the long hand points to 4?

When the long hand points to 10 it is how many minutes before the hour? How many minutes before the hour is it when the long hand points to 9?

Draw a picture of a clock face and on it show what time you got up this morning.

What were you doing yesterday at the times these clocks show?

ADDING DOLLARS AND CENTS

A hat cost $4.50, a necktie cost $1.25 and a pair of gloves cost $2.75. How much did all cost?

We can find the cost of all by adding.

$4.50 1.25 2.75 $8.50	Dollars and cents are added in the same way other numbers are added. When you write them, be sure to place the decimal points under each other. Notice that the dollar sign is placed before the first number to be added and before the answer.

Copy and add:

1.	2.	3.	4.	5.
$6.85	$9.40	$8.10	$4.54	$6.63
2.14	2.16	2.16	5.28	7.55
7.61	7.86	5.94	9.18	6.05

6.	7.	8.	9.	10.
$2.00	$6.97	$8.99	$8.99	$9.60
5.89	4.13	3.70	9.20	.65
2.19	5.77	4.18	8.69	8.55

EARNING AND SAVING MONEY

1. Fred, Dick and Harry are earning money to buy a radio set. Fred has earned $8.68, Dick, $2.39, and Harry, $5.89. How much have the three boys earned?

2. Ruth, Nell and Alice are saving money to go to a girls' camp. Ruth has $6.73, Nell, $1.79, and Alice only 88 cents. How much money have all three girls saved?

VACATION DAYS

Bob worked on the farm for his uncle George last summer. Before he went, his father gave him $5.75 and a new watch.

1. Bob looked at his watch when he reached the station. The long hand pointed to IV and the short hand pointed between IX and X. What time was it?

2. While Bob waited for the train, he bought his ticket. It cost $2.50. How much of his $5.75 was left?

3. On the train Bob bought a chocolate bar for 10¢ and a magazine for 35¢. Add these to the $2.50 he paid for his ticket. How much did he spend in all?

4. Uncle George paid Bob and each of his two cousins $3 a week for helping him. Bob saved $14.00, John saved $15.77, and Dick, $14.67. How much did they all save?

5. The boys had to go to bed early. When the long hand of the clock pointed to VI and the short hand pointed between VIII and IX, it was bedtime. What time was it?

SUBTRACTION WITH CARRYING

Here are three ways to subtract. Ask your teacher which one to use and use only that one.

On Monday morning there were 470 toys in the toy shop. The following Saturday night there were 283. How many had been sold?

We can find how many had been sold by subtracting.

1

	Change 0 to 10. 3 and 7 are 10. Write 7.
470	Change 8 to 9. Change 7 to 17. 9 and 8
283	are 17. Write 8.
187	Change 2 to 3. 3 and 1 are 4. Write 1.
	187 toys were sold.

2

	Change 0 to 10. 3 from 10 = 7. Write 7.
470	Add 1 to 8. Change 7 to 17. 9 from 17 = 8.
283	Write 8.
187	Add 1 to 2. 3 from 4 = 1. Write 1.
	187 toys were sold.

3

	Borrow 1 from 7 and change 0 to 10.
470	3 from 10 = 7. Write 7. Borrow 1 from 4.
283	8 from 16 = 8. Write 8. 2 from 3 = 1.
187	Write 1.
	187 toys were sold.

Copy and subtract:

1.	188 69	2.	470 256	3.	287 190	4.	986 388	5.	287 191
6.	480 196	7.	870 387	8.	910 792	9.	860 243	10.	740 225
11.	987 379	12.	588 139	13.	820 511	14.	722 406	15.	970 634
16.	520 360	17.	847 177	18.	988 492	19.	909 349	20.	728 209
21.	797 338	22.	980 496	23.	787 228	24.	879 282	25.	900 625
26.	907 354	27.	791 100	28.	666 158	29.	589 99	30.	826 226
31.	872 566	32.	174 83	33.	884 677	34.	109 29	35.	800 139
36.	887 408	37.	277 69	38.	566 448	39.	978 298	40.	800 218
41.	769 562	42.	898 309	43.	902 136	44.	864 657	45.	649 473

SUBTRACTING DOLLARS AND CENTS

Mary has \$9.70 and her brother has \$3.45. How much more has Mary than her brother?

We can find how much more Mary has by subtracting.

\$9.70 3.45 \$6.25	Dollars and cents are subtracted just as other numbers are subtracted. When you write them be sure that the decimal points are under each other.

Copy and subtract:

1. \$9.70 4.38	2. \$7.80 5.09	3. \$8.97 2.78	4. \$9.88 3.79	5. \$7.87 2.09
6. \$99.80 25.06	7. \$89.78 46.89	8. \$79.08 20.47	9. \$98.70 15.69	10. \$97.97 29.09
11. \$79.60 15.45	12. \$7.96 3.38	13. \$98.76 32.80	14. \$38.69 19.04	15. \$78.96 77.41

PROBLEMS

1. How much more must we pay for a big tricycle that costs \$17.79 than for a little one that costs \$8.99?

2. A big cart costs \$7.98. A little one costs \$.98. How much more does the big one cost?

3. An electric train costs \$9.98. A wind-up train costs \$3.79. How much less does the wind-up train cost?

WORDS WE USE IN SUBTRACTION

The number from which we subtract is the *minuend.*

The number we subtract is the *subtrahend.*

The result in subtraction is the *difference* or *remainder.*

999	*minuend*
432	*subtrahend*
567	*difference* or *remainder*

HOW WE PROVE SUBTRACTION

Subtract 958 from 1890.

We prove subtraction by adding the **subtrahend** and the **difference.** If their sum equals the **minuend,** the subtraction is correct.

1890	**minuend**	Proof: 958
958	**subtrahend**	932
932	**difference or remainder**	1890

Copy, subtract and prove:

1. 999 176	2. 999 912	3. 999 853	4. 999 407	5. 888 509	6. 707 458
7. 909 477	8. 990 166	9. 909 204	10. 990 583	11. 980 377	12. 870 426
13. 900 140	14. 990 236	15. 999 571	16. 909 136	17. 700 267	18. 800 428

SUMS TO LEARN

Here are the numbers whose sums are six or sixteen. Study these numbers and their sums. Then try to name them without looking in the book.

2	1	4	5	6	3	7	9	8
4	5	2	1	0	3	9	7	8
6	6	6	6	6	6	16	16	16

REVIEW THESE THREE MANY TIMES

9	7	6
7	9	0
16	16	6

I can add two numbers to make six.

One number is 4. The other is ? $4 + ? = 6$

One number is 3. The other is ? $3 + ? = 6$

One number is 1. The other is ? $1 + ? = 6$

I can add two numbers to make sixteen.

One of them is 9. The other is ? $9 + ? = 16$

Add without copying:

1.	4	1	3	6	2	5	4
	12	15	13	10	24	21	32
2.	9	9	2	2	1	7	7
	17	27	14	34	65	19	79

Add without copying:

4	6	7	4	4	6	7
6	4	3	0	6	4	3
2	1	4	5	3	7	9
4	5	2	1	3	9	7

1. Add 9 to each of these: 37, 47, 67, 87.
2. Add 4 to each of these: 12, 52, 72, 92.
3. Add 5 to each of these: 11, 31, 51, 71.
4. Add 7 to each of these: 19, 29, 49, 69.

Begin at the bottom and add without copying. Use a folded answer paper:

3	7	6	4	6	3	8	6
3	9	9	0	4	1	9	9
4	4	7	9	6	9	4	7
1	7	7	3	2	8	9	6
5	9	3	4	4	9	7	4

Copy and add:

1.	2.	3.	4.	5.	6.
67	36	67	59	98	76
43	74	43	57	76	79
64	36	76	48	9	41
46	44	34	86	81	90
72	67	78	93	60	12
74	39	68	63	36	44

7. $666 + 404 + 679 + 477$.
8. $464 + 606 + 434 + 122$.
9. $982 + 466 + 778 + 678$.

Add and be sure to use the dollar sign and the decimal point to show that your answer is dollars and cents.

1.	2.	3.	4.	5.
\$1.04	\$7.86	\$9.47	\$4.66	\$2.70
3.67	5.49	7.96	7.30	6.04
4.09	4.27	8.63	8.70	5.92

PROBLEMS

1. Charles paid 10 cents for a fishline and 6 cents for some hooks. How much did he spend in all?

2. Mary gathered 9 eggs on Friday and 7 eggs on Saturday. How many did she gather in the two days?

3. George caught 12 fish one day and 14 the next day. How many fish did he catch in all?

4. Tom brought home two packages. Each weighed 13 pounds. How much did both weigh?

Subtract. Be sure you know the answers:

6	6	6	6	6	6	6	16	16	16
1	2	5	0	3	4	6	8	7	9

REVIEW THESE THREE MANY TIMES

16	16	16
−9	−7	−8
7	9	8

Subtract without copying:

666	666	6666	6666	606
253	146	3524	3154	435

1. Subtract each of these numbers from 16: 5, 7, 9, 6, 3, 0.

2. Subtract each of these numbers from 36: 7, 3, 5, 8, 6, 9.

3. Subtract 9 from each of these: 26, 56, 76, 96.

4. Subtract 7 from each of these: 36, 46, 66, 86.

PROBLEMS

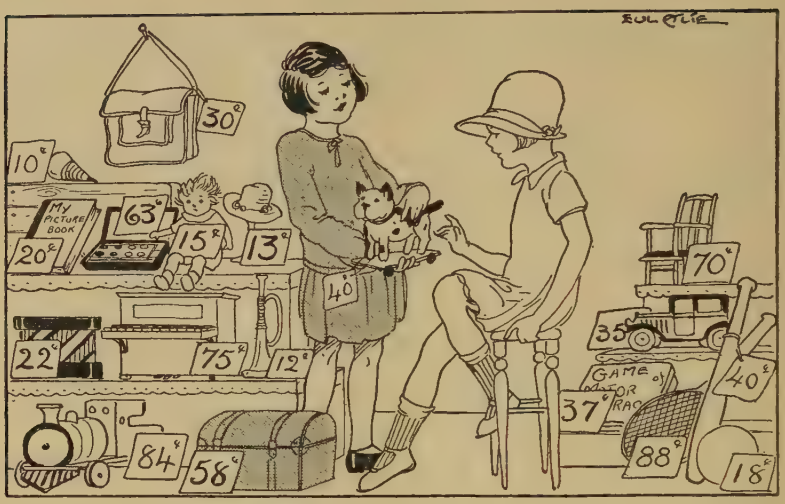
1. Ruth sells candy in her father's store after school. She sold 52 chocolate bars last week and 34 this week. How many chocolate bars did she sell both weeks?

2. James spends his vacations on his father's farm. Last summer he picked 37 quarts of raspberries and 29 quarts of blackberries. How many quarts did he pick?

3. Tom's father went fishing with some friends. They caught 46 fish one day and 29 the next. How many more fish did they catch the first day?

4. The boys who belong to the Hikers' Club walked 48 miles one week and 38 the next week. How many miles did they walk both weeks?

5. Kate was in the country 56 days during her summer vacation. Nell was there 37 days. How much longer was Kate there than Nell?



PLAYING STORE

Find the amount of change you should receive if you gave a 50-cent piece for:

1. A doll
2. A top
3. A ball
4. A doll's hat
5. A drum
6. A picture book
7. A bat
8. A horn
9. An automobile
10. A book bag

Tell how much change would be received from a dollar bill given to pay for:

1. A toy piano
2. A paint box
3. A toy engine
4. A toy dog
5. A doll's trunk
6. A tennis racket
7. A game
8. A doll's chair

MULTIPLYING NUMBERS OF TWO FIGURES

One bag of marbles holds 34 marbles. How many will 2 bags hold?

We can find how many marbles the 2 bags will hold by adding 34 and 34.

$$\begin{array}{r} 34 \\ 34 \\ \hline 68 \end{array}$$

or

We can find how many marbles the 2 bags will hold by multiplying 34 by 2.

$$\begin{array}{r} 34 \\ 2 \\ \hline 68 \end{array}$$

$2 \times 4 = 8$. Write 8.
$2 \times 3 = 6$. Write 6.

Two bags will hold 68 marbles.

Remember: In multiplying we always begin at the right and work to the left.

Copy and multiply:

1. $\begin{array}{r} 11 \\ 2 \\ \hline \end{array}$	2. $\begin{array}{r} 13 \\ 2 \\ \hline \end{array}$	3. $\begin{array}{r} 14 \\ 2 \\ \hline \end{array}$	4. $\begin{array}{r} 21 \\ 2 \\ \hline \end{array}$	5. $\begin{array}{r} 22 \\ 2 \\ \hline \end{array}$	6. $\begin{array}{r} 43 \\ 2 \\ \hline \end{array}$
7. $\begin{array}{r} 42 \\ 2 \\ \hline \end{array}$	8. $\begin{array}{r} 23 \\ 2 \\ \hline \end{array}$	9. $\begin{array}{r} 33 \\ 2 \\ \hline \end{array}$	10. $\begin{array}{r} 41 \\ 2 \\ \hline \end{array}$	11. $\begin{array}{r} 24 \\ 2 \\ \hline \end{array}$	12. $\begin{array}{r} 32 \\ 2 \\ \hline \end{array}$

Multiply:

1. $\begin{array}{r} \$74 \\ 2 \\ \hline \end{array}$	2. $\begin{array}{r} \$83 \\ 2 \\ \hline \end{array}$	3. $\begin{array}{r} \$91 \\ 2 \\ \hline \end{array}$	4. $\begin{array}{r} \$52 \\ 2 \\ \hline \end{array}$	5. $\begin{array}{r} \$60 \\ 2 \\ \hline \end{array}$	6. $\begin{array}{r} \$94 \\ 2 \\ \hline \end{array}$
7. $\begin{array}{r} 44¢ \\ 2 \\ \hline \end{array}$	8. $\begin{array}{r} 31¢ \\ 2 \\ \hline \end{array}$	9. $\begin{array}{r} 62¢ \\ 2 \\ \hline \end{array}$	10. $\begin{array}{r} 53¢ \\ 2 \\ \hline \end{array}$	11. $\begin{array}{r} 20¢ \\ 2 \\ \hline \end{array}$	12. $\begin{array}{r} 40¢ \\ 2 \\ \hline \end{array}$

MULTIPLICATION WITH CARRYING

Ruth gave a birthday party and bought 2 boxes of chocolates for 49¢ each. How much did the chocolates cost?

We can find out by multiplying.

$$\begin{array}{r} 49\,¢ \\ \times\ 2 \\ \hline 98\,¢ \end{array}$$

Think $2 \times 9 = 18$. Write 8. Carry the 1 of the 18. Think $2 \times 4 = 8$. Add the 1 that is carried. Write 9.
The chocolates cost 98¢.

Multiply:

1.	45	2.	36	3.	28	4.	47	5.	19	6.	86	7.	75
	2		2		2		2		2		2		2
8.	$64	9.	$79	10.	$95	11.	$66	12.	$90	13.	$99	14.	$87
	2		2		2		2		2		2		2

PROBLEMS

1. How many wheels are there on 56 bicycles?

2. Dan earns 90¢ a day. How much will he earn in 2 days?

3. George broke 2 panes of a window playing ball. The panes cost 75¢ apiece. How much did George have to pay?

4. Jennie bought 2 boxes of candy at 55¢ a box. Find first by addition and then by multiplication how much she paid.

5. Ned bought 2 rabbits for 65¢ each. Find how much they cost him.

DIVIDING BY TWO

Say the table of twos.

How many twos are there in 12?

$6 \times 2 = 12$ $\qquad$ $12 = 6$ twos

When we find out how many twos there are in 12 we call it *dividing* 12 by 2.

The sign of *division is* $\div$. It means *divided by.*

Both of these examples tell you to divide:

$12 \div 2 = 6$ $\qquad$ $2\overline{)12}$ $\quad 6$

2 pints = 1 quart

4 pints = ? quarts.	$4 \div 2 = ?$
6 pints = ? quarts.	$6 \div 2 = ?$
8 pints = ? quarts.	$8 \div 2 = ?$
10 pints = ? quarts.	$10 \div 2 = ?$
12 pints = ? quarts.	$12 \div 2 = ?$
14 pints = ? quarts.	$14 \div 2 = ?$
16 pints = ? quarts.	$16 \div 2 = ?$
18 pints = ? quarts.	$18 \div 2 = ?$
20 pints = ? quarts.	$20 \div 2 = ?$

REVIEW THESE THREE MANY TIMES

$2 \div 2 = 1$	$18 \div 2 = 9$	$0 \div 2 = 0$

Divide:

1. $18 \div 2 = ?$ $\quad 12 \div 2 = ?$ $\quad 14 \div 2 = ?$ $\quad 0 \div 2 = ?$

2. $2\overline{)8}$ $\quad 2\overline{)10}$ $\quad 2\overline{)16}$ $\quad 2\overline{)4}$ $\quad 2\overline{)6}$ $\quad 2\overline{)2}$

ONE-HALF

Cut some large circles from paper. Play that the circles are pies. Cut each pie into two equal parts.

When anything is divided into two equal parts, each part is called *one-half*.

One-half is written $\frac{1}{2}$

To find $\frac{1}{2}$ of a number we divide the number by 2.

Read and give the answers:

1. $\frac{1}{2}$ of 6 desks = ? desks.
2. $\frac{1}{2}$ of 4 marbles = ? marbles.
3. $\frac{1}{2}$ of 10 eggs = ? eggs.
4. $\frac{1}{2}$ of 8 candies = ? candies.
5. $\frac{1}{2}$ of 12 cakes = ? cakes.
6. $\frac{1}{2}$ of 20 nuts = ? nuts.
7. $\frac{1}{2}$ of 18 cherries = ? cherries.
8. $\frac{1}{2}$ of 16 buns = ? buns.
9. $\frac{1}{2}$ of 14 apples = ? apples.
10. $\frac{1}{2}$ of 2 pies = ? pies.

Remember that $0 \div 2 = 0$

MULTIPLYING AND DIVIDING BY TWO

1. At 2 cents each, how many apples can be bought for 10 cents?

You can buy as many apples as there are 2's in 10, or 5 apples.

2. Two children took their lunch to the park. Each child took 6 sandwiches. How many sandwiches did the two children take?

Each child took 6 sandwiches, so the two children took 2 times 6 sandwiches, or 12 sandwiches.

Tell how to work these problems:

1. One hot day Mary made lemonade and sold it for 2 cents a glass. One man spent 12 cents. How many glasses did he buy?

2. At 2 cents each, how many postage stamps can you buy for 18 cents?

3. At 2 cents each, how many marbles can you buy for 20 cents?

4. Mary drew a line 2 inches long. Jane drew a line 5 times as long. How long was Jane's line?

5. Seven little girls went to a party on a rainy day. They all placed their rubbers in a row. How many rubbers were there?

6. Eight gloves were lying on a counter. How many pairs were there?

7. John had a strip of paper 14 inches long. He cut it into pieces 2 inches long. How many pieces did he have?

MEASURING

A foot rule is divided into 12 equal parts called inches.

The inches are numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12.

12 inches = 1 foot

1. With a foot rule draw a line one foot long. Draw a line six inches long. Draw a line four inches long.

2. How many inches are there in 2 feet?

3. How many inches are there in $\frac{1}{2}$ of a foot?

4. Find the length of your arithmetic book. Then find its width.

5. Guess the length of your desk, then measure it.

6. Guess the width of your desk, then measure it.

7. Guess the height of your desk, then measure it.

8. Guess the height of one of the boys in the room and then measure him.

9. Find the widths of the door and the windows in your room.

10. How many inches tall are you?

THE FOOT RULE AND THE YARDSTICK

Measure a yardstick with a foot rule. How many feet long is it?

Draw a line 1 yard long on the blackboard. Then with the foot rule divide it into feet.

12 inches (in.)	= 1 foot (ft.)
3 feet	= 1 yard (yd.)

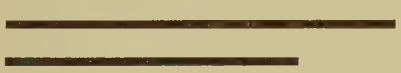
1. Guess and then measure the height of one of the girls in your room.

2. When your mother buys ribbon, how is it measured?

3. Name some other things that are sold by the same measure as ribbon.

4. Guess the length of your school room; then measure it with the yardstick. Find the width of the room.

5. How many inches long is a yardstick?



6. Guess the length of the first line. Then measure it with your foot rule.

7. The second line is how much longer than the first?

8. The third line is how much shorter than the second?

9. The third line is how much longer than the first?

SUMS TO LEARN

Here are the numbers whose sums are five or fifteen. Study these numbers and their sums. Then try to name them without looking in the book.

1	2	4	3	5	9	8	6	7
4	3	1	2	0	6	7	9	8
5	5	5	5	5	15	15	15	15

REVIEW THESE THREE MANY TIMES

7	9	8
8	6	7
15	15	15

I can add two numbers to make 5.

One number is 3. The other is ? $3 + ? = 5.$

One number is 4. The other is ? $4 + ? = 5.$

I can add two numbers to make 15.

One number is 9. The other is ? $9 + ? = 15.$

One number is 7. The other is ? $7 + ? = 15.$

Add without copying:

1.	1	5	2	7	4	6	3
	14	20	13	18	11	19	12
2.	11	15	12	17	14	16	13
	14	20	13	18	11	19	12

Add without copying:

3	5	3	6	5	5	5
2	0	2	5	5	8	9
1	8	9	7	6	0	4
4	7	6	8	9	7	2

1. Add 4 to each of these: 11, 31, 61, 91.
2. Add 3 to each of these: 12, 22, 52, 82.
3. Add 8 to each of these: 17, 27, 47, 67.
4. Add 9 to each of these: 16, 26, 56, 86.

Give the sums as quickly as you can:

$27 + 8 = ?$	$38 + 7 = ?$	$52 + 3 = ?$	$60 + 5 = ?$
$32 + 3 = ?$	$43 + 2 = ?$	$46 + 9 = ?$	$29 + 6 = ?$
$11 + 4 = ?$	$34 + 1 = ?$	$47 + 8 = ?$	$28 + 7 = ?$

Begin at the bottom and add. Use a folded answer paper:

2	7	9	4	7	5	9	8
3	9	8	8	9	7	5	6
5	4	3	3	4	2	0	1
6	8	1	9	2	0	8	3
9	7	4	6	3	5	7	2

Copy and add:

1.	2.	3.	4.	5.	6.	7.
75	45	58	47	33	27	40
32	62	71	68	76	68	16
53	43	34	45	34	45	74
51	84	63	65	69	67	98
44	61	82	70	76	68	77

Subtract. Be sure you know the answers:

5	5	5	5	5	5	15	15	15	15
3	2	1	4	0	5	7	9	6	8

REVIEW THESE THREE MANY TIMES

15	15	15
–9	–7	–6
6	8	9

Subtract without copying:

1.	555	555	555	555	555
	214	302	125	341	523
2.	5555	5550	5505	5500	
	4364	1428	3261	4370	
3.	15655	5555	5550	5500	
	9836	3708	4634	3680	

Copy, subtract and prove:

1.	$55.55	2.	$15.55	3.	$15.55	4.	$15.55
	24.31		9.43		8.23		7.04
5.	$15.55	6.	$55.55	7.	$55.55	8.	$50.50
	6.50		31.26		53.07		21.34
9.	$55.05	10.	$53.05	11.	$16.65	12.	$25.25
	12.79		21.68		7.78		20.17

USING WHAT WE HAVE LEARNED

1. Peggy's family drove 95 miles to grandmother's house. When they had gone 46 miles, Peggy asked: "How much farther is it?" What was the answer?

2. Nineteen boys and 16 girls were at May's party. How many children were there?

3. John paid 89 cents for a rake and 18 cents for some flower seeds. How much did he pay for both?

4. The parcel post man had 35 packages to deliver Christmas morning. When he had delivered 16, how many were there left on his wagon?

5. A grocer bought 45 watermelons. He sold 19 of them. How many watermelons did he have left?

6. James has an allowance of 75 cents a week. Last week he spent 47 cents. How much of his allowance was left?

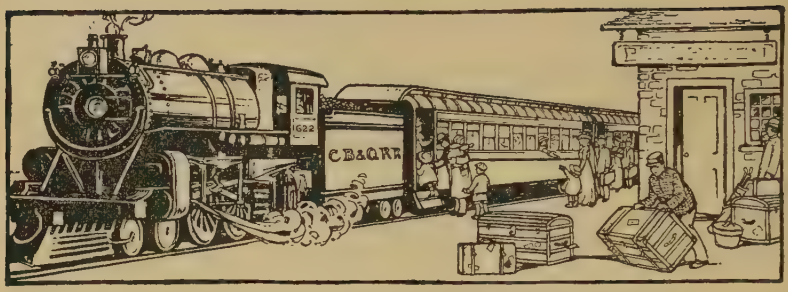
7. Tickets to the circus cost 85 cents each. How much did it cost Donald and his father to go?

8. A teacher bought two quarts of ice cream for a class party. How much did the 2 quarts cost at 65 cents a quart?

9. A boy had a kite string 245 feet long. He gave 138 feet of the string to his brother. How many feet of string had he left?

10. Mary's sled cost $3.75 and her skates cost $3.25. How much did both cost?

11. Mr. Jackson paid $75.50 for an overcoat and $36.75 for a suit of clothes. How much more did the overcoat cost than the suit?



GOING TO GRANDMOTHER'S

1. John and Billy are going all alone on the train to grandmother's. They were so excited that they woke up when one hand of the clock pointed to V and the other to XII. What time was that?

2. Father bought tickets for the 2 boys yesterday. They cost $7.18 apiece. How much did the tickets cost? How much change did father get from his $20 bill?

3. Mother packed the lunch for John and Billy. She thought:

Two chicken sandwiches for each boy are ? sandwiches.
Three jelly sandwiches for each boy are ? sandwiches.
Six cakes for each boy are ? cakes.

4. The town where grandmother lives is 297 miles away. Billy and John have traveled 25 miles now. How many more miles have they to go?

5. Billy is counting all the cows he sees on one side of the train. He has seen 37. John has seen 29 on the other side. How many have they seen? How many more has Billy seen than John?

THE TABLE OF THREES

Count by 3's to 30.

There are 3 feet in one yard.

Give the number of feet in:

2 yards.	$2 \times 3 = ?$	7 yards.	$7 \times 3 = ?$
3 yards.	$3 \times 3 = ?$	8 yards.	$8 \times 3 = ?$
4 yards.	$4 \times 3 = ?$	9 yards.	$9 \times 3 = ?$
5 yards.	$5 \times 3 = ?$	10 yards.	$10 \times 3 = ?$
6 yards.	$6 \times 3 = ?$		

Give the missing numbers:

Four 3's are ?	Three 3's are ?	Nine 3's are ?
Two 3's are ?	Ten 3's are ?	Seven 3's are ?
Five 3's are ?	Six 3's are ?	Eight 3's are ?

THE TABLE OF THREES

$1 \times 3 = 3$	$6 \times 3 = 18$
$2 \times 3 = 6$	$7 \times 3 = 21$
$3 \times 3 = 9$	$8 \times 3 = 24$
$4 \times 3 = 12$	$9 \times 3 = 27$
$5 \times 3 = 15$	$10 \times 3 = 30$
$3 \times 0 = 0$	$0 \times 3 = 0$

REVIEW THESE THREE MANY TIMES

$9 \times 3 = 27$ $0 \times 3 = 0$ $7 \times 3 = 21$

Add:

4	5	6	7	8	9	10
4	5	6	7	8	9	10
4	5	6	7	8	9	10

How many are three 4's? Three 5's? Three 6's? Three 7's? Three 8's? Three 9's? Three 10's?

Tell how much I must pay for:

Two 3-cent candies.	Three 8-cent whistles.
Four 3-cent marbles.	Three 4-cent pencils.
Seven 3-cent stamps.	Three 3-cent oranges.
Five 3-cent apples.	Three 2-cent lemons.
Ten 3-cent erasers.	Three 5-cent cakes.
Eight 3-cent roses.	Three 10-cent dolls.
Nine 3-cent tops.	Three 6-cent games.
Six 3-cent oranges.	Three 9-cent melons.
Three 3-cent stamps.	Three 7-cent fish hooks.

It will be easy to learn the multiplication tables if you use this wheel to help you. Change the number at the center of the wheel for each new table. Multiply the number at the center by the numbers around the wheel. Then multiply the numbers around the wheel by the number at the center.

Multiply without copying:

1.	21	13	22	32	23	33
	3	3	3	3	3	3
2.	16	19	24	26	18	56
	3	3	3	3	3	3
3.	30	28	46	57	89	47
	3	3	3	3	3	3
4.	96	65	27	49	73	50
	3	3	3	3	3	3

PROBLEMS

1. John makes 46 cents every day from his paper route. How much does he make in 3 days?

2. Three boys each made 48 snowballs for a snowball fight. How many did they make in all?

3. John mailed 48 invitations to a party. He put a 2-cent stamp on each envelope. How much did the stamps cost?

4. Paul cleans sidewalks for 30 cents each. One day he cleaned 3 sidewalks. How much money did he make?

5. Alice planted 3 rows of tulip bulbs in her garden. There were 15 bulbs in each row. How many tulip bulbs did she plant?

6. Alice paid 3 cents apiece for the 45 tulip bulbs. How much did the bulbs cost?

DIVIDING BY THREE

Count by 3's to 30.

Give the missing numbers:

3 feet = ? yards.	3 ÷ 3 = ?
6 feet = ? yards.	6 ÷ 3 = ?
9 feet = ? yards.	9 ÷ 3 = ?
12 feet = ? yards.	12 ÷ 3 = ?
15 feet = ? yards.	15 ÷ 3 = ?
18 feet = ? yards.	18 ÷ 3 = ?
21 feet = ? yards.	21 ÷ 3 = ?
24 feet = ? yards.	24 ÷ 3 = ?
27 feet = ? yards.	27 ÷ 3 = ?
30 feet = ? yards.	30 ÷ 3 = ?

REVIEW THESE THREE MANY TIMES

27 ÷ 3 = 9 **3 ÷ 3 = 1** **24 ÷ 3 = 8**

Give the missing numbers:

30 = ? 3's	15 = ? 3's	24 = ? 3's
9 = ? 3's	21 = ? 3's	18 = ? 3's
12 = ? 3's	27 = ? 3's	6 = ? 3's

Divide:

$3\overline{)9}$	$3\overline{)12}$	$3\overline{)27}$	$3\overline{)18}$	$3\overline{)6}$
$3\overline{)15}$	$3\overline{)30}$	$3\overline{)3}$	$3\overline{)21}$	$3\overline{)24}$

18 ÷ 3 = ? 27 ÷ 3 = ? 24 ÷ 3 = ? 21 ÷ 3 = ?

ONE-THIRD

One day Kate brought a large red apple to school.

She asked the teacher to cut it into three equal parts so she could share it with two of her friends.

When anything is divided into three equal parts each part is called *one-third*.

One-third is written $\frac{1}{3}$

To find $\frac{1}{3}$ of a number, we divide the number by 3.

Read and give the answers:

1. $\frac{1}{3}$ of 6 apples = ?
2. $\frac{1}{3}$ of 9 apples = ?
3. $\frac{1}{3}$ of 12 apples = ?
4. $\frac{1}{3}$ of 15 apples = ?
5. $\frac{1}{3}$ of 21 apples = ?
6. $\frac{1}{3}$ of 3 marbles = ?
7. $\frac{1}{3}$ of 18 plums = ?
8. $\frac{1}{3}$ of 24 books = ?
9. $\frac{1}{3}$ of 30 pounds = ?
10. $\frac{1}{3}$ of 27 cents = ?

Remember that $0 \div 3 = 0$.

PROBLEMS

1. Mary bought 48 cookies for her party. They cost 3 cents apiece. How much did she pay for them?

2. Pencils cost 3 cents apiece. How much will it cost to supply pencils to a class of 30 pupils?

3. Rose's mother bought 18 apples at 3 cents apiece. How much did they cost?

4. Harry has 3 cents to spend. How many 3-cent popcorn balls can he buy?

5. Frank's mother bought 3 grape-fruit for 21 cents. How much did each cost?

6. Helen went to the bakery and bought 15 fried cakes at 3 cents each. How much did they cost?

7. Uncle John brought the children 19 balloons. If they cost 3 cents apiece how much did he pay for them?

8. Ann's mother paid 27 cents for the candles for Ann's birthday cake. If they were 3 cents each, how many did she buy?

9. Jim had 30 cents and spent $\frac{1}{3}$ of his money for an ice cream soda. How much did he spend?

10. Cut a piece of paper 6 inches long. Fold it into 3 equal parts. Then cut the paper where it is folded. One of the pieces is what part of 6 inches?

11. One inch is what part of 3 inches?

12. Kate gave $\frac{1}{3}$ of her apple to Mary and $\frac{1}{3}$ to Polly. How many thirds did Kate give away?

THE THERMOMETER

Betty was teasing her mother to let her go without her coat, but her mother said, "It's too cold. Go look at the thermometer and see."

Here is the thermometer on Betty's porch. It measures the temperature just as a yardstick measures length. A yardstick is divided into little spaces called inches. A thermometer is divided into spaces to show **degrees.** There are two degrees for each space. The liquid in the glass measures the temperature in degrees. It shows more degrees on a warm day than on a cold day.

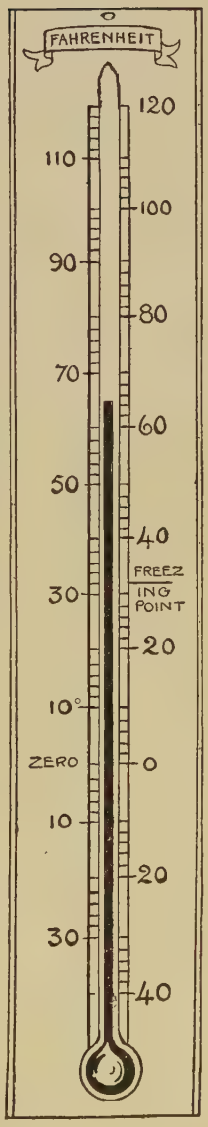
When Betty looked at the thermometer it pointed to sixty-five degrees. We write sixty-five degrees in this way: 65° This means 65° above zero.

1. Find zero on the thermometer.

2. Water freezes when it is 32° above zero. Can you find the freezing point on the thermometer?

3. One day last summer the thermometer showed 75° at 7 o'clock in the morning. At noon it showed 96°. Was it warmer or colder at noon? How much?

4. On the coldest day last winter, it was 1° below zero at noon and 15° below at bedtime. Was it colder or warmer at bedtime?



SUMS TO LEARN

Here are the numbers whose sums are four or fourteen. Study these numbers and their sums. Then try to name them without looking in the book.

2	4	3	1	7	5	6	9	8
2	0	1	3	7	9	8	5	6
4	4	4	4	14	14	14	14	14

REVIEW THESE THREE MANY TIMES

8	6	9
6	8	5
14	14	14

I can add two numbers to make 4.

One number is 2. The other is ? $2 + ? = 4.$

One number is 1. The other is ? $1 + ? = 4.$

I can add two numbers to make 14.

One number is 5. The other is ? $5 + ? = 14.$

One number is 8. The other is ? $8 + ? = 14.$

One number is 7. The other is ? $7 + ? = 14.$

Give the sums without copying:

1.	9	9	7	9	6	5	8
	5	15	17	25	38	19	16
2.	12	19	13	10	15	16	18
	12	5	11	14	9	8	6

Add without copying:

4	6	6	6	4	5	5
6	4	4	4	6	5	5
2	3	7	9	6	5	8
2	1	7	5	8	9	6

1. Add 3 to each of these: 11, 31, 61, 91.
2. Add 8 to each of these: 16, 26, 56, 86.
3. Add 5 to each of these: 19, 39, 49, 69.
4. Add 6 to each of these: 18, 28, 58, 78.
5. Add 9 to each of these: 15, 25, 45, 85.

Find the sums as quickly as you can:

$9 + 25 = ?$	$8 + 36 = ?$	$6 + 28 = ?$	$7 + 57 = ?$
$24 + 0 = ?$	$45 + 9 = ?$	$38 + 6 = ?$	$50 + 4 = ?$
$10 + 24 = ?$	$12 + 2 = ?$	$46 + 8 = ?$	$0 + 74 = ?$

Begin at the bottom and add:

26	46	68	36	95	66	43
44	68	42	54	15	49	50
95	86	51	57	88	70	56
39	44	83	27	46	55	38

Copy and try to write all the sums in three minutes:

$6.96	$7.86	$ .94	$3.66	$ .95
4.05	.20	8.05	8.01	8.08
3.49	6.38	5.49	5.73	5.06

PROBLEMS

1. Paul sold 18 tags to help raise money for the school football team. Kate sold 26. How many did they sell in all?

2. The football team wanted to make $40. They made that much and $24 more. How much did they make in all?

3. There are 25 chickens in one coop and 29 in another. How many chickens are there in the two coops?

4. A newsboy sold 32 papers one afternoon and 52 the next. How many did he sell in the two days?

Make up other problems for your classmates to solve.

Subtract. Be sure you know the answers:

4	4	4	4	4	14	14	14	14	14
3	0	2	1	4	7	5	8	9	6

REVIEW THESE THREE MANY TIMES

14	14	14
−9	−5	−6
5	9	8

Subtract and prove:

1. 14804	2. 12400	3. 44044	4. 54444
7556	6245	31628	22519
5. $54.46	6. $48.94	7. $14.44	8. $14.47
21.43	27.03	3.10	9.02

THE TABLE OF FOURS

Count by 4's to 40.

Add columns of 4's to help you answer the following questions.

There are 4 pecks in 1 bushel

Give the number of pecks in:

2 bushels.	$2 \times 4 = ?$	7 bushels.	$7 \times 4 = ?$
3 bushels.	$3 \times 4 = ?$	8 bushels.	$8 \times 4 = ?$
4 bushels.	$4 \times 4 = ?$	9 bushels.	$9 \times 4 = ?$
5 bushels.	$5 \times 4 = ?$	10 bushels.	$10 \times 4 = ?$
6 bushels.	$6 \times 4 = ?$		

Give the missing numbers:

Two 4's are ?	Ten 4's are ?	Eight 4's are ?
Nine 4's are ?	Six 4's are ?	Four 4's are ?
Three 4's are ?	Seven 4's are ?	Five 4's are ?

THE TABLE OF FOURS

$1 \times 4 = 4$	$6 \times 4 = 24$
$2 \times 4 = 8$	$7 \times 4 = 28$
$3 \times 4 = 12$	$8 \times 4 = 32$
$4 \times 4 = 16$	$9 \times 4 = 36$
$5 \times 4 = 20$	$10 \times 4 = 40$
$0 \times 4 = 0$	$4 \times 0 = 0$

REVIEW THESE THREE MANY TIMES

$7 \times 4 = 28$ $9 \times 4 = 36$ $8 \times 4 = 32$

Multiply:

$10 \times 4 = ?$	$4 \times 10 = ?$	$5 \times 4 = ?$	$4 \times 5 = ?$
$6 \times 4 = ?$	$4 \times 6 = ?$	$7 \times 4 = ?$	$4 \times 7 = ?$
$9 \times 4 = ?$	$4 \times 9 = ?$	$8 \times 4 = ?$	$4 \times 8 = ?$

How much must I pay for:

Six 4-cent cakes?
Eight 4-cent stamps?
Two-4-cent oranges?
Ten 4-cent pears?
Seven 4-cent toys?
Nine 4-cent pencils?
Five 4-cent tops?
Three 4-cent notebooks?
Four 4-cent erasers?

Four 8-cent grapefruit?
Four 3-cent lemons?
Four 4-cent erasers?
Four 6-cent dolls?
Four 9-cent cakes?
Four 5-cent cups?
Four 10-cent pies?
Four 7-cent tickets?
Four 2-cent bananas?

Multiply without copying:

1.	23 × 4	41 × 4	58 × 4	75 × 4	82 × 4	39 × 4
2.	94 × 4	65 × 4	35 × 4	52 × 4	78 × 4	90 × 4
3.	26 × 4	67 × 4	40 × 4	29 × 4	33 × 4	77 × 4

DRY MEASURE

8 quarts (qt.)	= 1 peck (pk.)
4 pecks	= 1 bushel (bu.)

1. In what does the farmer measure his grain?

2. A bushel measure holds 4 pecks. How many pecks are there in $\frac{1}{2}$ of a bushel of wheat?

3. A peck measure holds 8 quarts. How many quarts are there in a bushel of corn?

4. How many quarts are there in 2 pecks of potatoes?

5. What things besides grain are bought and sold by dry measure?

6. The vegetable dealer often sells vegetables by the $\frac{1}{2}$ peck. How many quarts are there in a half peck?

7. How many pecks are there in 3 bushels of potatoes?

8. How many bushels are there in 12 pecks of peas?

9. Henry gathered 16 quarts of nuts. How many pecks did he gather?

MULTIPLYING

A farmer sold four barrels of apples at \$4.95 a barrel. How much was he paid for the apples? We can find what he was paid by multiplying.

	Think $4 \times 5 = 20$. Write 0. Carry 2.
\$4.95	Think $4 \times 9 = 36$. Add 2. Write 8.
4	Carry 3.
\$19.80	Think $4 \times 4 = 16$. Add 3. Write 19.
	The farmer was paid \$19.80.

When multiplying dollars and cents by a whole number, place the decimal point in the answer so that the same number of figures follow it as follow the decimal point in the multiplicand.

MULTIPLYING ZEROS

At \$7.08 each what will 4 railroad tickets cost? We can find the cost by multiplying.

\$7.08	Think $4 \times 8 = 32$. Write 2. Carry 3.
4	Think $4 \times 0 = 0$. Add 3. Write 3.
\$28.32	Think $4 \times 7 = 28$. Write 28.
	The tickets will cost \$28.32.

Copy and multiply:

1. \$2.46 × 4	2. \$4.05 × 3	3. \$7.16 × 4	4. \$9.90 × 4	5. \$8.87 × 4	6. \$7.96 × 4
7. \$3.57 × 4	8. \$6.53 × 4	9. \$6.53 × 3	10. \$7.08 × 4	11. \$9.19 × 3	12. \$5.39 × 4
13. \$9.09 × 5	14. \$8.06 × 2	15. \$6.01 × 4	16. \$6.78 × 5	17. \$7.07 × 2	18. \$2.34 × 5

DIVIDING BY FOUR

Count by 4's to 40.

There are 4 quarts in a gallon

Give the missing number:

4 quarts = ? gallons.	4 ÷ 4 = ?
8 quarts = ? gallons.	8 ÷ 4 = ?
12 quarts = ? gallons.	12 ÷ 4 = ?
16 quarts = ? gallons.	16 ÷ 4 = ?
20 quarts = ? gallons.	20 ÷ 4 = ?
24 quarts = ? gallons.	24 ÷ 4 = ?
28 quarts = ? gallons.	28 ÷ 4 = ?
32 quarts = ? gallons.	32 ÷ 4 = ?
36 quarts = ? gallons.	36 ÷ 4 = ?
40 quarts = ? gallons.	40 ÷ 4 = ?

REVIEW THESE THREE MANY TIMES

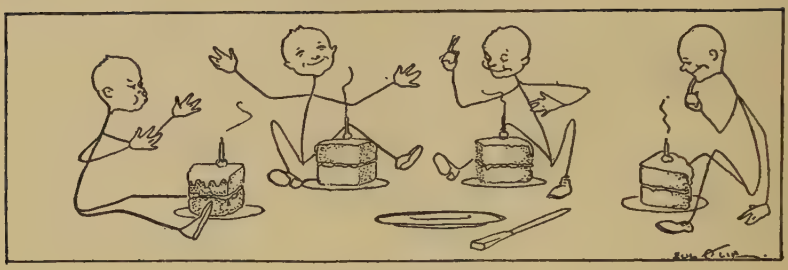
36 ÷ 4 = 9	**28 ÷ 4 = 7**	**24 ÷ 4 = 6**

Give the missing numbers:

24 = ? 4's	32 = ? 4's	8 = ? 4's
40 = ? 4's	12 = ? 4's	20 = ? 4's
16 = ? 4's	36 = ? 4's	28 = ? 4's

Divide:

$4\overline{)20}$	$4\overline{)12}$	$4\overline{)40}$	$4\overline{)32}$	$4\overline{)4}$
$4\overline{)8}$	$4\overline{)24}$	$4\overline{)16}$	$4\overline{)36}$	$4\overline{)28}$



ONE-FOURTH

On his birthday John had a cake with 4 candles on it. As there were four boys at John's party his mother cut the cake into 4 equal parts. Each piece was what part of the whole cake?

When anything is divided into four equal parts, each part is called *one-fourth.*

One-fourth is written $\frac{1}{4}$

To find $\frac{1}{4}$ of a number we divide the number by 4.

1. There were eight cherries on a plate and each of the four boys had $\frac{1}{4}$ of them. How many cherries did each boy have?

2. What is $\frac{1}{4}$ of 8? $8 \div 4 = ?$

3. There were 12 tarts on a plate and each of the four boys had $\frac{1}{4}$ of them. How many tarts did each boy have?

4. What is $\frac{1}{4}$ of 12? $12 \div 4 = ?$

5. There were 16 candies in a box and each of the four boys had $\frac{1}{4}$ of them. How many candies did each boy have?

6. What is $\frac{1}{4}$ of 16? $16 \div 4 = ?$

USING WHAT WE HAVE LEARNED

1. If it takes 4 tires for one automobile, how many will be needed for 32 automobiles?

2. Ruth made Christmas cards to sell. She sold them for 25 cents a dozen. She sold 4 dozen. How much money did she get for the cards?

3. The boys in Bill's Sunday School class had a hot dog roast. Bill furnished 4 dozen rolls. At 22 cents a dozen how much did he pay for them?

4. Tom and Ralph furnished the corn for a corn roast. They paid 30 cents a dozen for 4 dozen ears. How much did the corn cost?

5. At 40 cents a pound, how much will $\frac{1}{4}$ of a pound of candy cost?

6. A family uses 4 quarts of milk each day. How many quarts will it use in 14 days?

7. At 4 cents each, how many tops can be bought for 36 cents? For 16 cents? For 32 cents?

8. What is $\frac{1}{4}$ of 28?

9. In John's cake there was a ring in one $\frac{1}{4}$ and a thimble in another $\frac{1}{4}$. How many fourths had no prizes?

10. How many fourths are $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$?

Copy and multiply:

1. $\begin{array}{r} 112 \\ \times\ 4 \\ \hline \end{array}$	2. $\begin{array}{r} 229 \\ \times\ 4 \\ \hline \end{array}$	3. $\begin{array}{r} 340 \\ \times\ 4 \\ \hline \end{array}$	4. $\begin{array}{r} 153 \\ \times\ 4 \\ \hline \end{array}$	5. $\begin{array}{r} 237 \\ \times\ 4 \\ \hline \end{array}$
6. $\begin{array}{r} 189 \\ \times\ 4 \\ \hline \end{array}$	7. $\begin{array}{r} 164 \\ \times\ 4 \\ \hline \end{array}$	8. $\begin{array}{r} 238 \\ \times\ 4 \\ \hline \end{array}$	9. $\begin{array}{r} 745 \\ \times\ 4 \\ \hline \end{array}$	10. $\begin{array}{r} 236 \\ \times\ 4 \\ \hline \end{array}$

LIQUID MEASURE

2 pints (pt.)	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)

1. The milkman usually sells his milk in quart or pint bottles. How many pints make a quart?

2. If you poured a pint of milk into a quart bottle how much of the quart bottle would you fill? A pint is what part of a quart?

3. How many pints are there in 2 quarts? In 4 quarts?

4. A milkman put a gallon of milk into quart bottles. How many bottles did he use?

5. A milkman put a gallon of milk into pint bottles. How many bottles did he use?

6. Two quarts is what part of a gallon?

7. An automobile uses a gallon of gasoline in running 17 miles. How many miles will it run on 4 gallons of gasoline?

8. If gasoline costs 23¢ a gallon, what will be the cost of 4 gallons?

SUMS TO LEARN

Here are the numbers whose sums are three or thirteen. Study these numbers and their sums. Then try to name them without looking in the book.

2	1	3	4	6	5	9	7	8
1	2	0	9	7	8	4	6	5
3	3	3	13	13	13	13	13	13

REVIEW THESE THREE MANY TIMES

5	8	7
8	5	6
13	13	13

I can add two numbers to make 3.

One number is 2. The other is ? $2 + ? = 3.$

One number is 3. The other is ? $3 + ? = 3.$

I can add two numbers to make 13.

One number is 9. The other is ? $9 + ? = 13.$

One number is 7. The other is ? $7 + ? = 13.$

One number is 5. The other is ? $5 + ? = 13.$

Add without copying:

1.	4	3	8	6	1	5	7
	19	10	25	17	12	28	26
2.	24	23	18	16	21	15	17
	19	20	35	17	12	28	26

Add without copying:

6	5	6	8	4	9	6	4
4	5	0	2	6	1	4	1
1	0	7	8	4	7	9	8
2	3	0	5	9	6	4	0

1. Add 9 to each of these: 14, 34, 54, 84.
2. Add 7 to each of these: 16, 26, 46, 66.
3. Add 8 to each of these: 15, 45, 65, 85.
4. Add 4 to each of these: 29, 49, 69, 79.
5. Add 6 to each of these: 27, 37, 57, 87.
6. Add 5 to each of these: 28, 38, 68, 88.

Give the sums as quickly as you can:

$8 + 25 = ?$	$6 + 37 = ?$	$9 + 14 = ?$	$3 + 40 = ?$
$33 + 0 = ?$	$66 + 7 = ?$	$87 + 6 = ?$	$35 + 8 = ?$
$43 + 20 = ?$	$33 + 10 = ?$	$0 + 53 = ?$	$76 + 7 = ?$

Begin at the bottom and add without copying:

4	7	3	5	6	2	4	1
7	3	4	6	4	5	4	6
3	0	6	4	6	5	9	4
2	4	5	6	0	9	7	8
1	9	8	7	3	4	3	5

Copy and try to find all the sums in five minutes:

1.	2.	3.	4.	5.	6.
\$2.45	\$6.78	\$8.56	\$2.09	\$1.78	\$5.70
.78	.32	2.04	9.34	4.52	.37
9.04	.46	8.59	.58	.68	8.96
3.46	5.77	4.64	3.62	7.05	8.27

Subtract. Be sure you know the answers.

3	3	3	3	13	13	13	13	13	13
1	0	3	2	9	7	8	4	6	5

REVIEW THESE THREE MANY TIMES

13	13	13
−4	−9	−8
9	4	5

1. Subtract 8 from each of these: 23, 43, 63, 83.
2. Subtract 9 from each of these: 23, 43, 53, 73.
3. Subtract 6 from each of these: 43, 53, 73, 93.

Subtract and prove:

1.	2.	3.	4.	5.	6.
$33.83	$37.33	$13.35	$13.39	$13.63	$13.33
21.02	12.03	9.21	8.03	6.05	4.17

Multiply and add:

4 ×
- 7 and 1 are ?
- 2 and 2 are ?
- 3 and 3 are ?
- 8 and 4 are ?
- 9 and 5 are ?
- 6 and 6 are ?
- 4 and 7 are ?

3 ×
- 6 and 7 are ?
- 3 and 8 are ?
- 9 and 2 are ?
- 4 and 4 are ?
- 7 and 3 are ?
- 2 and 6 are ?
- 8 and 5 are ?

WORDS WE USE IN MULTIPLICATION

The number that we multiply is called the *multiplicand.*

The number by which we multiply is called the *multiplier.*

The answer in multiplication is called the *product.*

$$\begin{array}{r} 365 \\ \times\ 3 \\ \hline 1095 \end{array}$$

multiplicand
multiplier
product

PROBLEMS

1. Grace sold 4 sweaters at $4.75 each. How much did she receive for the sweaters?

2. Fanny's mother bought 4 yards of silk at $3.80 a yard. How much did the silk cost?

3. Sam sold 4 pet rabbits at 75 cents each. How much did he get for them?

Copy and multiply:

1. $\begin{array}{r} 143 \\ \times\ 4 \\ \hline \end{array}$	2. $\begin{array}{r} 261 \\ \times\ 3 \\ \hline \end{array}$	3. $\begin{array}{r} 346 \\ \times\ 2 \\ \hline \end{array}$	4. $\begin{array}{r} 428 \\ \times\ 4 \\ \hline \end{array}$	5. $\begin{array}{r} 179 \\ \times\ 4 \\ \hline \end{array}$
6. $\begin{array}{r} 526 \\ \times\ 2 \\ \hline \end{array}$	7. $\begin{array}{r} \$298 \\ \times\ 4 \\ \hline \end{array}$	8. $\begin{array}{r} \$221 \\ \times\ 4 \\ \hline \end{array}$	9. $\begin{array}{r} \$340 \\ \times\ 4 \\ \hline \end{array}$	10. $\begin{array}{r} \$153 \\ \times\ 4 \\ \hline \end{array}$
11. $\begin{array}{r} \$237 \\ \times\ 4 \\ \hline \end{array}$	12. $\begin{array}{r} \$509 \\ \times\ 4 \\ \hline \end{array}$	13. $\begin{array}{r} \$164 \\ \times\ 4 \\ \hline \end{array}$	14. $\begin{array}{r} \$238 \\ \times\ 4 \\ \hline \end{array}$	15. $\begin{array}{r} \$2.63 \\ \times\ 4 \\ \hline \end{array}$

USING WHAT WE HAVE LEARNED

1. There were 33 boys in Donald's Boy Scout troop. Eight boys moved away. How many were there then?

2. A scout troop went on a hike one Saturday. They walked 5 miles in the morning and 8 miles in the afternoon. How far did they walk that day?

3. Nine boys in one troop were first class scouts, 23 were second class scouts. How many more second class scouts were there than first class scouts?

4. Harry picked 14 quarts of cherries from one tree and 9 quarts from another. How many quarts did he pick from the two trees?

5. An overcoat cost $27 and a suit $18. Find the cost of both.

6. Paul had 33 cents and spent 15 cents for a kite. How much did he have left?

7. There are 43 pupils in Susie's class. Twenty of them are boys. How many are girls?

8. Mother bought a quart of strawberries for 38 cents and a bottle of milk for 15 cents. How much did she pay for both?

9. A baker made 53 loaves of bread. How many did he have left after he had sold 16 loaves?

10. May's class made 23 valentines one day and 20 the next. How many valentines did they make in the two days?

11. David paid 43 cents for a knife and 15 cents for a fish line. How much more did the knife cost?

SUMS TO LEARN

Here are the numbers whose sums are 2 or 12. Study these numbers and their sums. Then try to name them without looking in the book.

1	2	7	9	8	5	3	4	6
1	0	5	3	4	7	9	8	6
2	2	12	12	12	12	12	12	12

REVIEW THESE THREE MANY TIMES

5	7	8
7	5	4
12	12	12

I can add two numbers to make 12.

1. One number is 7. The other is ? $7 + ? = 12.$
2. One number is 4. The other is ? $4 + ? = 12.$
3. One number is 9. The other is ? $9 + ? = 12.$
4. One number is 6. The other is ? $6 + ? = 12.$

Add without copying:

1.	1	2	7	9	6	8	5
	21	20	15	13	26	14	27
2.	3	4	3	6	7	6	2
	7	8	9	4	5	6	8
	1	7	0	9	4	5	0
	1	5	3	3	8	7	4

1. Add 5 to each of these: 17, 27, 37, 67.
2. Add 3 to each of these: 19, 39, 49, 79.
3. Add 4 to each of these: 18, 28, 58, 68.
4. Add 7 to each of these: 25, 45, 65, 85.
5. Add 9 to each of these: 23, 33, 53, 73.
6. Add 8 to each of these: 24, 44, 64, 84.

Add without copying:

8	4	8	3	6	4	9	4
9	1	8	0	5	6	1	6
1	5	2	7	5	7	4	0
7	3	5	9	4	3	3	7
5	9	7	3	8	2	5	5

Copy and add:

1.	2.	3.	4.	5.
\$ .94	\$4.77	\$ .86	\$4.76	\$ .37
6.48	3.35	3.02	.34	8.08
.47	.85	7.65	2.95	.50
4.63	3.27	.49	4.17	3.34

6.	7.	8.	9.	10.
465	224	332	234	726
440	817	382	474	854
396	597	484	926	251
816	582	446	922	869
253	789	183	541	478
937	779	163	331	148

USING WHAT WE HAVE LEARNED

1. Jack's father has 72 apple trees and 44 pear trees in his orchard. How many more apple trees than pear trees are there?

2. Ned's and Will's classes went to the park in the street car. There were 34 children from Ned's class and 38 children from Will's class. How many went from the two classes?

3. Nell's class had an entertainment. The girls used 42 yd. of pink crepe paper and 28 yd. of blue crepe paper for dresses. How much more pink paper than blue paper did they use?

4. My grandfather keeps chickens. He has 239 white ones and 183 brown ones. How many chickens is that?

5. Dorothy had a party. She paid $2.22 for ice cream and $1.47 for candy. How much more did she pay for the ice cream than for the candy?

6. John and his friend went to the beach. Each paid $.45 for carfare, $.57 for their lunch, and $.35 for amusements. How much did each one pay?

7. Will's father bought him a pair of skates that cost $3.47 and skating shoes that cost $5.20. How much more did the shoes cost than the skates?

8. Fifteen boys march 3 in a row. How many rows are there?

9. How many quarts of ice cream are there in 4 gallons?

10. At 65¢ a quart, how much will 4 quarts of ice cream cost?

Subtract. Be sure you know the answers:

2	2	2	12	12	12	12	12	12	12
1	2	0	7	3	6	9	5	8	4

REVIEW THESE THREE MANY TIMES

12	12	12
−5	−4	−3
7	8	9

Give the remainders as quickly as you can:

12	32	22	42	62	72	52	92	82	72
2	1	0	3	6	9	7	8	4	5

1. Subtract 7 from each of these: 22, 32, 42, 62.
2. Subtract 8 from each of these: 22, 52, 72, 92.
3. Subtract 3 from each of these: 22, 32, 52, 72.
4. Subtract 6 from each of these: 32. 52, 82, 92.

Copy, subtract and prove:

1. \$22.72	2. \$28.22	3. \$12.22	4. \$12.52	5. \$12.92
12.01	26.02	3.02	4.09	7.10
6. \$12.02	7. \$12.12	8. \$20.20	9. \$20.02	10. \$22.32
6.45	9.08	7.18	14.75	13.29
11. \$43.26	12. \$72.34	13. \$92.43	14. \$84.02	15. \$99.80
16.19	25.18	28.39	26.79	54.85

MAKING CHANGE

When you buy anything at a store and do not give the exact amount of money in paying for it, the storekeeper has to make change.

If you buy something for 35¢ and give the storekeeper a 50-cent piece, in making change he probably would give you a nickel and a dime. He should say, "40-50."

If you buy something that costs 68¢, in making change from a dollar, he should say, "69-70-75-$1.00." What coins would he probably give you?

When Henry emptied his bank and went to do his Christmas shopping, he made six purchases. Say aloud what the storekeeper said when he made change. Use your pencil to find the answer when necessary.

Henry gave:

1. A quarter of a dollar to pay for an 18¢ box of paints.

2. A half dollar for doll dishes at 23¢ and a little table at 15¢.

3. A fifty-cent piece for 5 yards of tinsel at 7¢ a yard.

4. A one-dollar bill for a bat at 35¢ and seven marbles at 4¢ each.

5. A half dollar and a quarter for candy canes at 32¢, hard candy at 14¢ and licorice at 10¢.

6. A two-dollar bill for a train at 49¢, a toy automobile at 22¢ and a box of soldiers at 16¢.

THE TABLE OF FIVES

$1 \times 5 = 5$	$6 \times 5 = 30$
$2 \times 5 = 10$	$7 \times 5 = 35$
$3 \times 5 = 15$	$8 \times 5 = 40$
$4 \times 5 = 20$	$9 \times 5 = 45$
$5 \times 5 = 25$	$10 \times 5 = 50$
$0 \times 5 = 0$	$5 \times 0 = 0$

How many are five 6's? Five 7's? Five 8's? Five 9's? Five 10's?

Give the products:

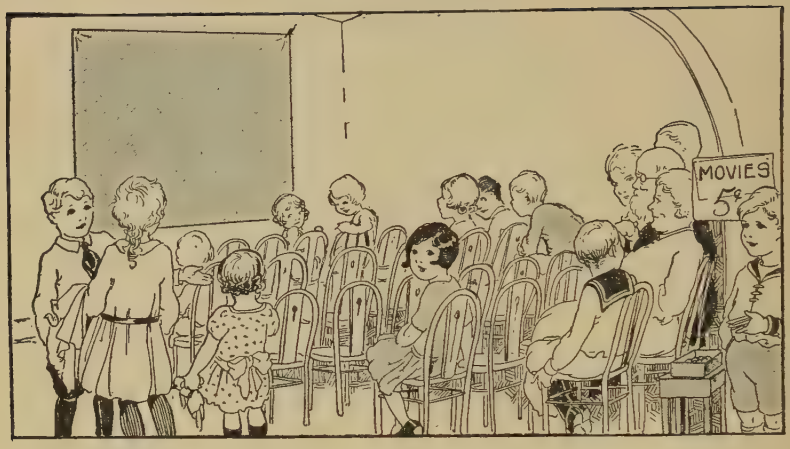
$10 \times 5 = ?$	$5 \times 10 = ?$	$9 \times 5 = ?$	$5 \times 9 = ?$
$6 \times 5 = ?$	$5 \times 6 = ?$	$7 \times 5 = ?$	$5 \times 7 = ?$
$4 \times 5 = ?$	$5 \times 4 = ?$	$8 \times 5 = ?$	$5 \times 8 = ?$

Tell how much I must pay for:

Six 5-cent cones.	Five 4-cent toys.
Four 5-cent cakes.	Five 6-cent melons.
Two 5-cent roses.	Five 10-cent knives.
Seven 5-cent tarts.	Five 7-cent pictures.
Ten 5-cent pies.	Five 3-cent plums.
Eight 5-cent pencils.	Five 9-cent games.
Three 5-cent cream puffs.	Five 2-cent papers.
Nine 5-cent trolley rides.	Five 8-cent combs.

Copy and multiply:

40	30	60	80	70	402	301	509
5	5	5	5	5	5	5	5



AT THE MOVIES

George is giving "movies" with his magic lantern. He charges 5¢ admission and shows his pictures twice.

1. If one ticket costs 5¢ how much will it cost for Mary and her 4 brothers?

2. How much will father, mother and grandmother pay at 5¢ apiece?

3. The Brown twins are coming. How much will they have to pay at 5¢ apiece?

4. There are five rows of seats with 6 chairs in a row. How many seats are there?

5. How many people must come to fill 4 rows, with 6 chairs in a row.

6. If eight people stay for the second performance and George makes them pay again, how much will they pay at 5¢ apiece?

BUYING MILK AT SCHOOL

Half pint bottles of milk are sold in many schools at 5 cents a bottle. One teacher wrote on the blackboard the record of the milk sold to her pupils for one week.

Jennie . . . 3	Fanny . . 6	Tony 5
Will 4	George . . 8	Howard . . 7
Jack 2	Julia . . . 10	Donald . . . 9
Mabel . . . 4	Ben 9	Grace . . . 8

1. Tell how much each pupil spent for milk during the week.

2. How many bottles of milk were sold to Jennie, Will, Jack and Mabel?

3. Tell how many bottles of milk were bought by Fannie, George, Julia and Ben.

4. Find the number of bottles bought by Tony, Howard, Donald and Grace.

5. Name the four children that drank the least milk.

6. Name the three children that drank the most milk.

7. Do you buy milk in your school? If you do, tell how much it costs you for a week.

Copy and multiply:

1.	123 × 5	2.	256 × 5	3.	199 × 5	4.	284 × 5	5.	363 × 5	6.	547 × 5
7.	437 × 5	8.	340 × 5	9.	585 × 5	10.	271 × 5	11.	301 × 5	12.	462 × 5

DIVIDING BY FIVE

Count by 5's from 5 to 50.

Give the missing numbers:

5¢ = ? nickels.	5 ÷ 5 = ?
10¢ = ? nickels.	10 ÷ 5 = ?
15¢ = ? nickels.	15 ÷ 5 = ?
20¢ = ? nickels.	20 ÷ 5 = ?
25¢ = ? nickels.	25 ÷ 5 = ?
30¢ = ? nickels.	30 ÷ 5 = ?
35¢ = ? nickels.	35 ÷ 5 = ?
40¢ = ? nickels.	40 ÷ 5 = ?
45¢ = ? nickels.	45 ÷ 5 = ?
50¢ = ? nickels.	50 ÷ 5 = ?

REVIEW THESE THREE MANY TIMES

0 ÷ 5 = 0 **5 ÷ 5 = 1** **45 ÷ 5 = 9**

Give the missing numbers:

25 = ? 5's	50 = ? 5's	40 = ? 5's
15 = ? 5's	10 = ? 5's	45 = ? 5's
30 = ? 5's	20 = ? 5's	35 = ? 5's

Divide:

$5\overline{)20}$	$5\overline{)30}$	$5\overline{)15}$	$5\overline{)40}$	$5\overline{)45}$
$5\overline{)10}$	$5\overline{)50}$	$5\overline{)25}$	$5\overline{)5}$	$5\overline{)35}$

40 ÷ 5 = ? 50 ÷ 5 = ? 35 ÷ 5 = ? 5 ÷ 5 = ?

ONE-FIFTH

There are 5 nickels in twenty-five cents. A nickel is what part of the twenty-five cents?

When anything is divided into five equal parts, each part is called *one-fifth.*

One-fifth is written $\frac{1}{5}$

To find $\frac{1}{5}$ of a number we divide the number by 5.

1. What is $\frac{1}{5}$ of 10 cents? Of 20¢? Of 15¢?

2. Mrs. Case cut a pie into 5 equal pieces and gave Dorothy one of the pieces. What part of the pie did Dorothy have?

Find each of the following:

$\frac{1}{5}$ of 25	$\frac{1}{5}$ of 50	$\frac{1}{5}$ of 45	$\frac{1}{5}$ of 20
$\frac{1}{5}$ of 35	$\frac{1}{5}$ of 40	$\frac{1}{5}$ of 15	$\frac{1}{5}$ of 10

MULTIPLYING AND ADDING A NUMBER

Give the answers:

$1 \times 5 + 1 = ?$	$2 \times 5 + 3 = ?$	$3 \times 5 + 1 = ?$
$2 \times 5 + 1 = ?$	$1 \times 5 + 2 = ?$	$2 \times 5 + 5 = ?$
$1 \times 5 + 3 = ?$	$2 \times 5 + 4 = ?$	$3 \times 5 + 3 = ?$

1. Add 1 to each product: 4×9 7×4 6×5
2. Add 2 to each product: 8×3 9×4 0×5
3. Add 3 to each product: 9×3 2×0 7×5
4. Add 4 to each product: 8×4 3×8 7×3

USING WHAT WE HAVE LEARNED

1. If you save a nickel a day, how long will it take to save 25 cents? 35 cents? 50 cents? 20 cents?

2. At 5 cents a bag, how much will 6 bags of peanuts cost? 8 bags? 10 bags?

3. When chocolate bars are selling at 5 cents a bar, how many bars can you buy for 50 cents?

4. The trolley fare is 5 cents. How much will 10 fares cost?

5. At a school picnic the teacher bought 10 ice cream cones at 5 cents each. How much did she pay for them?

6. Eight boys had a picnic. Each paid 5 cents to ride across the ferry. How much did all pay?

7. Frank's hens laid 9 eggs a day for 5 days. How many eggs did they lay during that time?

8. One bunch of fire-crackers costs 10 cents. How much will 10 bunches cost?

9. How many 5-cent ice cream cones can be bought for 40 cents?

Give the missing numbers:

$\frac{1}{2}$ of 8 is the same as 8 divided by ?

$\frac{1}{4}$ of 12 is the same as 12 divided by ?

$\frac{1}{3}$ of 6 is the same as 6 divided by ?

$\frac{1}{3}$ of 9 is the same as 9 divided by ?

$\frac{1}{4}$ of 16 is the same as 16 divided by ?

$\frac{1}{5}$ of 35 is the same as 35 divided by ?

DIVISION WITH A REMAINDER

Mary had seven cents. How many two-cent pencils could she buy and how much would she have left? We find out by dividing.

3 and 1 remainder $2\overline{)7}$	We think 7 divided by 2 equals 3 and 1 left over. We write 3 over 7 and 1 remainder at the right of 3. Mary could buy 3 pencils and have 1 cent left.

WORDS WE USE IN DIVISION

The number that we divide is the *dividend.*

The number by which we divide is the *divisor.*

The answer in division is the *quotient.*

The part of the dividend that is left after dividing is the *remainder.*

quotient **3** and **1** *remainder*
divisor $2\overline{)7}$ *dividend*

Remember: The *remainder* should always be less than the *divisor.*

Divide and give the quotient and the remainder:

$2\overline{)9}$ $2\overline{)11}$ $2\overline{)13}$ $2\overline{)15}$ $2\overline{)17}$ $2\overline{)19}$

If you give an equal number to each, tell how many you will have left over when you divide:

1. Ten cookies among 3 girls.
2. Twenty-five marbles among 3 boys.

MULTIPLICATION AND DIVISION

Multiply 8 by 3 and add 2. Then divide the result by 3 and give the quotient and remainder.

$8 \times 3 = 24$
$24 + 2 = 26$
$26 \div 3 = 8$ quotient and 2 remainder.

1. Multiply 7 by 4 and add 5. Then divide the result by 4 and give the quotient and the remainder.

2. Multiply 8 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

3. Multiply 6 by 3 and add 2. Then divide the result by 3 and give the quotient and the remainder.

4. Multiply 9 by 2 and add 1. Then divide the result by 2 and give the quotient and the remainder.

5. Multiply 8 by 4 and add 2. Then divide the result by 4 and give the quotient and the remainder.

6. Multiply 9 by 3 and add 2. Then divide the result by 3 and give the quotient and the remainder.

7. Multiply 5 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

8. Multiply 8 by 2 and add 1. Then divide the result by 2 and give the quotient and the remainder.

9. Multiply 6 by 4 and add 3. Then divide the result by 4 and give the quotient and the remainder.

10. Multiply 3 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

11. Multiply 9 by 4 and add 3. Then divide the result by 4 and give the quotient and the remainder.

SUMS TO LEARN

Here are the numbers whose sums are one or eleven. Study these numbers and their sums. Then try to name them without looking in the book:

1	9	8	7	6	2	3	4	5
0	2	3	4	5	9	8	7	6
1	11	11	11	11	11	11	11	11

REVIEW THESE THREE MANY TIMES

7	6	5
4	5	6
11	11	11

I can add two numbers to make eleven.

1. One number is 8. The other is ? $8 + ? = 11$
2. One number is 6. The other is ? $6 + ? = 11$
3. One number is 2. The other is ? $2 + ? = 11$
4. One number is 7. The other is ? $7 + ? = 11$

Give the sums:

1.	9	7	8	1	5	2	6
	12	24	13	20	16	19	15
2.	8	5	8	2	6	7	1
	3	6	2	8	4	3	0
	7	0	4	6	2	5	9
	4	1	7	5	9	6	2

1. Add 9 to each of these: 12, 42, 52, 72.
2. Add 8 to each of these: 13, 23, 43, 83.
3. Add 7 to each of these: 14, 34, 54, 74.
4. Add 6 to each of these: 15, 25, 65, 85.

Give the sums as quickly as you can:

$2+39=?$ $4+17=?$ $6+45=?$ $7+24=?$
$72+9=?$ $53+8=?$ $69+2=?$ $77+4=?$

$3+3+25=?$ $4+3+44=?$ $3+5+53=?$
$4+5+72=?$ $2+4+65=?$ $7+2+12=?$

Begin at the bottom and add:

1.

6	9	6	9	9	8	7	8	7
5	7	8	6	7	7	9	9	8
7	4	2	4	5	6	8	3	4
3	2	4	8	5	3	6	5	6
5	8	6	2	0	7	4	5	4
6	3	7	9	6	8	2	4	9
0	8	4	2	5	3	9	7	8

2.

39	94	53	83	94	80
71	16	57	27	80	45
82	68	75	54	29	67
29	33	26	47	98	99

Try to find all the sums in four minutes:

1.	2.	3.	4.	5.
\$7.52	\$5.50	\$4.03	\$5.73	\$7.64
.39	5.67	6.79	.07	.16
4.06	7.06	7.01	5.09	6.93
9.74	3.38	3.48	.22	9.98

Subtract. Be sure you know the answers:

1	1	11	11	11	11	11	11	11	11
1	0	3	6	7	8	2	4	9	5

REVIEW THESE THREE MANY TIMES

11	11	11
−4	−8	−9
7	3	2

1. Subtract 2 from each of these: 21, 41, 61, 81.
2. Subtract 4 from each of these: 31, 51, 61, 81.
3. Subtract 5 from each of these: 21, 31, 41, 91.
4. Subtract 3 from each of these: 41, 51, 71, 91.

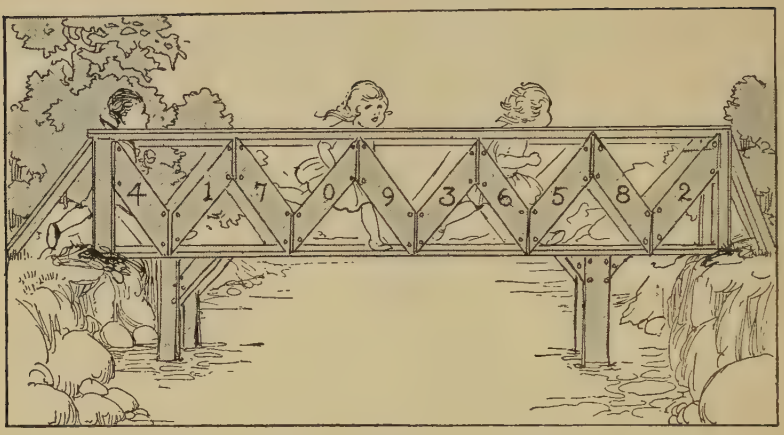
Subtract and prove:

1. \$21.11	2. \$61.11	3. \$11.17	4. \$11.11	5. \$11.01
16.91	35.90	1.40	2.38	4.39
6. \$11.00	7. \$10.01	8. \$10.01	9. \$10.00	10. \$10.01
2.48	3.06	5.09	7.02	8.36

1. There are 31 days in January. After 17 days have passed, how many days are left?

2. Harry and Fred are collecting stamps. Harry has 56 stamps and Fred has 55. How many stamps have the two boys?

3. Tom weighs 91 pounds and George 46 pounds. Find the difference in their weights.



CROSSING THE BRIDGES—A NUMBER RACE

Each line of numbers is a "bridge." To cross the "zero-bridge" you must begin at the left side and take 0 from each number in the 0-line. To cross the "one-bridge," you must begin at the left side and take 1 from each number in the 1-line. Cross the other bridges in the same way.

You may have a race to see which pupil or row can cross "the bridges" first without a mistake. Remember if you make a mistake you cannot cross.

0	4	1	7	0	9	3	6	5	8	2
1	5	2	1	7	4	10	8	3	6	9
2	7	3	9	2	5	8	11	4	10	6
3	9	12	3	4	8	10	6	11	5	7
4	13	5	11	9	7	12	4	8	6	10
5	8	11	14	6	9	13	5	7	10	12
6	6	10	8	15	11	7	14	9	12	13
7	10	7	16	9	11	8	15	12	14	13
8	15	11	8	10	17	12	14	9	13	16
9	12	18	14	17	13	15	9	16	10	11

Here are the 100 additions. The easier ones come first. Give the answers as quickly as you can:

0	5	2	3	1	3	1	6	7	1
0	5	2	3	2	1	1	1	1	6
8	2	0	0	1	1	8	4	9	4
1	9	4	2	4	3	2	5	9	4
7	2	0	5	8	6	1	8	9	0
7	3	5	1	8	6	7	0	2	6
9	4	4	1	5	2	1	2	1	3
1	1	2	9	2	7	8	8	0	4
5	2	2	2	5	9	2	0	4	3
4	4	0	1	0	3	6	1	6	8
3	0	4	0	9	6	0	7	1	3
0	3	0	8	0	3	7	0	5	2
0	6	4	8	3	5	2	3	7	4
9	0	3	3	9	3	5	5	2	7
8	3	5	3	4	7	6	6	7	6
4	7	6	6	8	3	2	5	4	7
9	6	5	4	5	7	8	7	9	6
4	4	9	9	7	5	9	6	5	9
9	8	8	9	6	5	8	7	7	9
8	7	5	6	8	8	6	8	9	7

Here are the 100 subtractions. The easier ones come first. Give the answers as quickly as you can:

0	5	3	7	1	8	3	4	5	6
0	1	2	7	1	1	3	4	3	6
4	9	9	3	5	6	5	9	6	3
2	1	9	0	4	0	2	0	1	1
2	7	6	9	4	8	4	5	5	6
1	1	5	8	1	4	0	5	0	3
4	2	10	10	6	2	7	6	7	8
3	2	1	2	2	0	0	4	2	8
10	9	11	12	8	1	8	7	7	9
5	5	2	6	0	0	7	3	5	3
7	8	10	9	8	12	10	10	9	9
6	2	7	7	6	8	6	4	4	6
8	10	10	11	14	9	7	12	11	10
3	9	3	7	7	2	4	9	5	8
11	12	11	13	8	12	11	12	16	11
3	7	6	6	5	3	9	4	8	8
12	18	11	14	15	14	15	13	13	13
5	9	4	8	8	6	6	7	5	8
13	16	15	15	13	17	14	17	16	14
9	7	7	9	4	9	5	8	9	9

HOW MUCH DO I KNOW?

You should be able to answer these questions all by yourself before you begin the second half of the third year.

1. How many cents are there in one dollar?
2. How many dimes are there in one dollar?
3. How many pints are there in one quart?
4. How many quarts are there in one gallon?
5. How many pecks are there in a bushel?
6. How many inches are there in one yard?
7. When numbers are added, what is the answer called?
8. When you subtract one number from another, what is the answer called?
9. The product is found by multiplying together the ? and the ?.
10. What is the answer called in multiplication?
11. What is the answer called in division?
12. How long does it take the long hand to go around the face of the clock?
13. How long does it take the short hand to go around the face of the clock?
14. How do you prove subtraction?
15. How do you find $\frac{1}{2}$ of a number?
16. How do you find $\frac{1}{5}$ of a number?
17. What is the product when you multiply zero by any number?

TESTS ON WHAT WE HAVE LEARNED

1. Give the sums:

7	9	8	9	8	7	5	6	5	9
9	6	7	5	6	6	8	5	9	7

2. Add:

5	7	5	9	6	7	9	4	6	7
6	5	8	1	3	8	8	8	9	6
2	4	6	4	7	6	5	6	7	7
6	5	7	3	7	7	8	6	8	7
9	7	7	6	4	9	7	8	5	8

3. Subtract:

177	133	109	143	1246	755
88	48	76	51	378	576
318	466	433	355	1244	1112
189	269	184	169	249	735

4. Multiply:

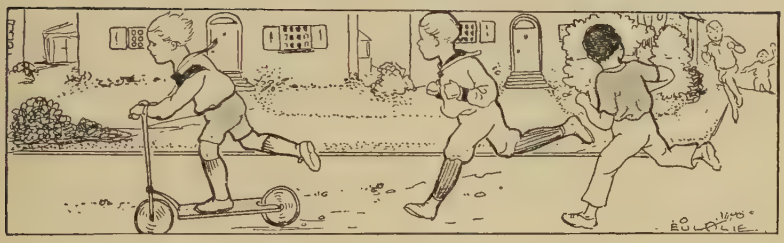
914	524	230	302	323	632
2	3	2	5	4	3

5. Divide:

$3\overline{)24}$	$2\overline{)18}$	$5\overline{)45}$	$4\overline{)36}$	$2\overline{)19}$
$2\overline{)17}$	$3\overline{)30}$	$4\overline{)32}$	$5\overline{)40}$	$3\overline{)27}$
$5\overline{)35}$	$4\overline{)40}$	$4\overline{)21}$	$3\overline{)13}$	$5\overline{)25}$

THIRD GRADE

SECOND HALF



THE ADVENTURES OF A SCOOTER

1. On Monday Jimmie and Bill bought a new scooter. It cost 4 dollars and they each paid half. How much did each pay?

2. The boys decided to rent their scooter for 2¢ a ride around the block. On Tuesday it was rented for 7 rides, on Wednesday for 9, on Thursday for 8. How much did they make each day?

3. On Friday the boys rented the scooter for 4¢ a ride to the end of the street and back. Seven boys rented it. How much was made that day?

4. On Saturday morning a wheel came off the scooter. It cost 16¢ to get it fixed. Jimmy and Bill each paid half. How much did each pay?

5. Saturday afternoon the handle of the scooter broke. It cost 18¢ to get it fixed. How much did Jimmy and Bill each pay if they divided the cost equally?

6. They made 76¢ the first week by renting the scooter and paid 34¢ for repairs. Did they make or lose money? How much?

THE TABLE OF SIXES

Add columns of 6's to help you find answers to these questions:

If one box of crayons costs 6 cents, give the cost of:

2 boxes.	$2 \times 6 = ?$	7 boxes.	$7 \times 6 = ?$
3 boxes.	$3 \times 6 = ?$	8 boxes.	$8 \times 6 = ?$
4 boxes.	$4 \times 6 = ?$	9 boxes.	$9 \times 6 = ?$
5 boxes.	$5 \times 6 = ?$	10 boxes.	$10 \times 6 = ?$
6 boxes.	$6 \times 6 = ?$		

Give the missing numbers:

Two 6's = ?	Four 6's = ?	Five 6's = ?
Six 6's = ?	Eight 6's = ?	Nine 6's = ?
Three 6's = ?	Seven 6's = ?	Ten 6's = ?

THE TABLE OF SIXES

$1 \times 6 = 6$	$6 \times 6 = 36$
$2 \times 6 = 12$	$7 \times 6 = 42$
$3 \times 6 = 18$	$8 \times 6 = 48$
$4 \times 6 = 24$	$9 \times 6 = 54$
$5 \times 6 = 30$	$10 \times 6 = 60$
$0 \times 6 = 0$	$6 \times 0 = 0$

REVIEW THESE THREE MANY TIMES

$9 \times 6 = 54$ $8 \times 6 = 48$ $7 \times 6 = 42$

In the tables you have studied you have learned that:

$6 \times 2 = 12$ $6 \times 4 = 24$ $6 \times 6 = 36$
$6 \times 3 = 18$ $6 \times 5 = 30$

Add:

7	8	9	10
7	8	9	10
7	8	9	10
7	8	9	10
7	8	9	10
7	8	9	10

How many are six 7's? Six 8's? Six 9's? Six 10's?

Give the products:

$8 \times 6 = ?$ $6 \times 8 = ?$ $7 \times 6 = ?$ $6 \times 7 = ?$
$9 \times 6 = ?$ $6 \times 9 = ?$ $10 \times 6 = ?$ $6 \times 10 = ?$

How much must I pay for:

Two 6-cent erasers?
Eight 6-cent tarts?
Four 6-cent tops?
Ten 6-cent rides?
Three 6-cent cakes?
Seven 6-cent balloons?
Nine 6-cent candies?
Five 6-cent brushes?
Six 6-cent whistles?

Six 8-cent melons?
Six 4-cent pencils?
Six 7-cent tickets?
Six 6-cent cakes?
Six 9-cent crayons?
Six 3-cent papers?
Six 5-cent oranges?
Six 2-cent stamps?
Six 10-cent pies?

Copy and multiply:

1. 24 × 6	2. 35 × 6	3. 41 × 6	4. 70 × 6	5. 86 × 6	6. 49 × 6
7. 238 × 6	8. 145 × 6	9. 482 × 6	10. 365 × 6	11. 178 × 6	12. 529 × 6
13. 207 × 6	14. 350 × 6	15. 483 × 6	16. 191 × 6	17. 621 × 6	18. 132 × 6
19. \$1.40 × 6	20. \$3.61 × 6	21. \$2.05 × 6	22. \$3.47 × 6		
23. \$1.89 × 6	24. \$4.50 × 6	25. \$7.98 × 6	26. \$8.89 × 6		

Tell how much money Mary had at first if she bought:

1. One two-cent pencil and had one cent left.
2. Two two-cent pencils and had one cent left.
3. Three two-cent pencils and had one cent left.
4. Four two-cent pencils and had one cent left.
5. Five two-cent pencils and had one cent left.
6. Six two-cent pencils and had one cent left.
7. Seven two-cent pencils and had one cent left.
8. Eight two-cent pencils and had one cent left.
9. Nine two-cent pencils and had one cent left.

Give the answers:

$1 \times 2 + 1 = ?$	$4 \times 2 + 1 = ?$	$7 \times 2 + 1 = ?$
$2 \times 2 + 1 = ?$	$5 \times 2 + 1 = ?$	$8 \times 2 + 1 = ?$
$3 \times 2 + 1 = ?$	$6 \times 2 + 1 = ?$	$9 \times 2 + 1 = ?$

DIVIDING BY SIX

Count by 6's to 60.

Count by 6's from 60 to 6.

The school children are having a parade. There are 6 in each row.

Twelve children make ? rows.	$12 \div 6 = ?$
Eighteen children make ? rows.	$18 \div 6 = ?$
Twenty-four children make ? rows.	$24 \div 6 = ?$
Thirty children make ? rows.	$30 \div 6 = ?$
Thirty-six children make ? rows.	$36 \div 6 = ?$

Give the missing numbers:

$42 = ?$ 6's	$42 \div 6 = ?$	$54 = ?$ 6's	$54 \div 6 = ?$
$48 = ?$ 6's	$48 \div 6 = ?$	$60 = ?$ 6's	$60 \div 6 = ?$

REVIEW THESE THREE MANY TIMES

$6 \div 6 = 1$ $\quad 18 \div 6 = 3$ $\quad 48 \div 6 = 8$

6. Divide:

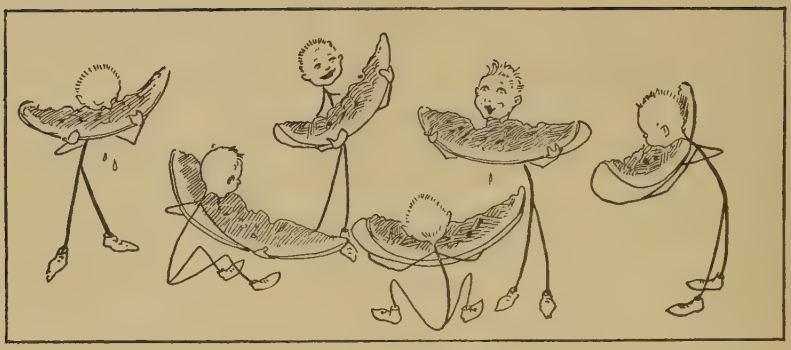
$6\overline{)36}$	$6\overline{)12}$	$6\overline{)6}$	$6\overline{)48}$	$6\overline{)30}$
$6\overline{)42}$	$6\overline{)24}$	$6\overline{)54}$	$6\overline{)60}$	$6\overline{)18}$

$6 \div 6 = ?$ $\quad 42 \div 6 = ?$ $\quad 24 \div 6 = ?$ $\quad 60 \div 6 = ?$

1. With 42 cents, how many 6¢ tops can I buy?

2. With 54 cents, how many 6¢ trolley tickets can I buy?

3. How many 6¢ chocolate bars can I buy for 36 cents?



ONE-SIXTH

John's father cut a watermelon into 6 equal pieces, and gave it to six boys. What part of the watermelon did each boy have?

When anything is divided into six equal parts, each part is called *one-sixth.*

One-sixth is written $\frac{1}{6}$

To find $\frac{1}{6}$ of a number we divide the number by 6.

1. What is $\frac{1}{6}$ of 12 cents?
2. What is $\frac{1}{6}$ of 18 cents?
3. What is $\frac{1}{6}$ of 24 cents?
4. What is $\frac{1}{6}$ of 30 cents?

5. Ruth's mother cut a cake into 6 equal pieces and gave her two of the pieces. What part of the whole cake did Ruth have? What part was left?

Find each of the following:

$\frac{1}{6}$ of 36	$\frac{1}{6}$ of 42	$\frac{1}{6}$ of 48	$\frac{1}{6}$ of 30
$\frac{1}{6}$ of 60	$\frac{1}{6}$ of 54	$\frac{1}{6}$ of 24	$\frac{1}{6}$ of 18

BUYING AND SELLING BY THE DOZEN

12 things are called one dozen (doz.)

1. How many cookies are there in a dozen?

2. What are some of the things your mother buys by the dozen?

3. What are some of the things the baker sells by the dozen?

4. How many buns are there in one-half of a dozen?

5. How many rolls are there in two dozen?

6. How many cookies are there in $\frac{1}{3}$ of a dozen?

7. If a hen lays an egg every day, how long will it take her to lay $1\frac{1}{2}$ dozen?

8. Fred keeps hens and sells the eggs. He sold 2 dozen to Mrs. Brown. How many eggs did he count out?

9. Mrs. Smith took 3 dozen eggs. How many eggs did Fred deliver to her?

10. Fanny's mother put $1\frac{1}{2}$ dozen buttons on a dress she was making. How many did she use?

11. What will 6 dozen eggs cost at 54 cents a dozen?

12. At 36 cents a dozen, what will $\frac{1}{4}$ dozen oranges cost?

Give the missing numbers:

$\frac{1}{2}$ dozen = ?	$1\frac{1}{2}$ dozen = ?
$\frac{1}{4}$ dozen = ?	$1\frac{1}{4}$ dozen = ?
$\frac{1}{3}$ dozen = ?	$1\frac{1}{3}$ dozen = ?

PROBLEMS TO WORK AND TELL ABOUT

1. There are 6 buckles on one overshoe. How many buckles are there on a pair of overshoes?

Each overshoe has 6 buckles, so 2 overshoes will have 2×6 buckles or 12 buckles.

2. If one melon costs 6 cents, how many melons can you buy for 18 cents?

You can buy as many melons as there are 6's in 18, or 3 melons.

Tell how to work these problems:

1. Uncle John bought rope to make jumping ropes for 8 little girls. If the jumping ropes were 6 feet long, how much rope did he have to buy?

2. Kate paid 18 cents for half a dozen bananas. How much did the bananas cost apiece? How much would a dozen cost?

3. There are 6 apples in one basket. How many apples are there in 7 baskets?

4. If 6 oranges cost 24 cents, how much will one cost? How much will a dozen cost?

5. Six boys went camping for a week. It cost them $30. How much was that apiece?

6. There are 42 seats in our room. They are placed in 6 rows. How many seats in a row?

7. John's father works 6 days a week. If he is paid $5 a day, how much does he earn in a week?

8. Howard bought his mother half a dozen handkerchiefs. They cost 72 cents. How much did each cost?

TEST IN ADDITION

Add without copying. Use a folded answer paper. Try to find all the sums in ten minutes:

1.

41	98	21	51	27	64
38	16	53	44	32	10
28	23	30	20	21	96
45	41	87	31	25	77
15	10	36	20	61	25
20	92	71	95	43	20

2.

54	98	87	67	95	65
90	56	99	65	84	32
83	47	67	86	76	80
89	33	58	38	73	35
40	60	30	57	69	20
91	77	99	39	46	36

3.

40	69	17	57	70	14
63	85	78	97	86	23
34	80	89	45	97	58
74	68	94	97	46	91
90	21	65	87	46	65
27	30	68	39	69	44

4.

40	50	99	57	18	50
12	26	66	97	35	33
21	86	86	68	43	76
19	10	49	92	73	40
14	23	15	57	24	38
36	70	68	88	29	39

SHORT DIVISION

Dorothy paid 68 cents for baby ribbon at 2 cents a yard. How many yards did she buy? We find the number of yards by dividing.

$$\begin{array}{r} 34 \\ 2\overline{)68} \end{array}$$

Begin at the left. 2 is contained in 6 three times. Write 3 over 6.

2 is contained in 8 four times. Write 4 over 8.

Dorothy bought 34 yards.

In a schoolroom 126 books were divided into 3 equal piles. How many books were there in each pile? We find the number of books in each pile by dividing.

$$\begin{array}{r} 42 \\ 3\overline{)126} \end{array}$$

3 is contained in 12 four times. Write 4 over 2.

3 is contained in 6 two times. Write 2 over 6.

There were 42 books in each pile.

To prove division when there is no remainder we multiply the **quotient** by the **divisor.** If the answer equals the **dividend** the division is correct.

$$\begin{array}{rr} & 42 \text{ quotient} \\ \text{divisor } & 3\overline{)126} \text{ dividend} \end{array}$$

Proof:

$$\begin{array}{r} 42 \\ 3 \\ \hline 126 \end{array}$$

Find the quotients and prove:

1. $4\overline{)168}$ 2. $3\overline{)156}$ 3. $3\overline{)273}$ 4. $4\overline{)248}$ 5. $5\overline{)155}$ 6. $6\overline{)126}$

7. $5\overline{)255}$ 8. $6\overline{)186}$ 9. $4\overline{)284}$ 10. $3\overline{)186}$ 11. $2\overline{)248}$ 12. $3\overline{)159}$

DIVIDING DOLLARS AND CENTS

Three boys raised vegetables. They sold the vegetables for $27.69. What was each boy's share if they divided the money equally? We find out by dividing.

$$3\overline{)\$27.69}\quad\$9.23$$

3 is contained in 27 nine times. Write 9 over 7.

3 is contained in 6 two times. Write 2 over 6.

3 is contained in 9 three times. Write 3 over 9.

Place the decimal point in the quotient over the decimal point in the dividend. Do not forget the $.

$9.23 is correct because $3 \times \$9.23 = \$27.69$.

Find the quotients and prove:

1. $3\overline{)\$12.39}$ 2. $2\overline{)\$18.46}$ 3. $3\overline{)\$21.63}$ 4. $4\overline{)\$16.88}$

PROBLEMS

1. A man paid $36.48 for 4 kindergarten tables. What was the price of each?

2. David has $24.80 in the savings bank. His sister Ruth has one-fourth as much. How much has Ruth?

3. A Sunday School teacher bought 6 Little Red Riding Hood stories for her class. She paid $6.60 for them. What was the price of each book?

4. Bob's father bought him an electric railroad. The engine and cars cost $5.89, the track $2.39 and the transformer $4.66. How much did they all cost?

A NUMBER GAME

Choose a leader to divide the class into four groups. The first gives the product. The second group gives the product plus the number added. The third group gives the quotient and the fourth group gives the remainder.

1. Multiply 6 by 5 and add 3. Then divide the result by 5 and give the quotient and the remainder.

2. Multiply 4 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

3. Multiply 8 by 5 and add 2. Then divide the result by 5 and give the quotient and the remainder.

4. Multiply 8 by 6 and add 4. Then divide the result by 6 and give the quotient and the remainder.

5. Multiply 6 by 6 and add 5. Then divide the result by 6 and give the quotient and the remainder.

6. Multiply 9 by 6 and add 3. Then divide the result by 6 and give the quotient and the remainder.

7. Multiply 9 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

8. Multiply 7 by 6 and add 5. Then divide the result by 6 and give the quotient and the remainder.

9. Multiply 7 by 5 and add 4. Then divide the result by 5 and give the quotient and the remainder.

10. Multiply 5 by 6 and add 2. Then divide the result by 6 and give the quotient and the remainder.

11. Multiply 9 by 4 and add 3. Then divide the result by 4 and give the quotient and the remainder.

DRILL IN DIVISION

Read across the page. Give the quotients and the remainders. Choose sides and see which side will make the better score. If a pupil fails to give the right answer it counts one against his side.

1.	$2\overline{)5}$	$2\overline{)17}$	$3\overline{)4}$	$3\overline{)16}$	$4\overline{)13}$	$2\overline{)7}$
2.	$2\overline{)15}$	$3\overline{)19}$	$3\overline{)28}$	$4\overline{)25}$	$2\overline{)9}$	$2\overline{)19}$
3.	$3\overline{)10}$	$4\overline{)5}$	$4\overline{)21}$	$2\overline{)13}$	$3\overline{)7}$	$3\overline{)22}$
4.	$4\overline{)9}$	$4\overline{)33}$	$2\overline{)0}$	$3\overline{)13}$	$3\overline{)25}$	$4\overline{)17}$
5.	$4\overline{)29}$	$3\overline{)5}$	$3\overline{)17}$	$4\overline{)10}$	$4\overline{)30}$	$4\overline{)23}$
6.	$3\overline{)8}$	$3\overline{)23}$	$4\overline{)14}$	$4\overline{)38}$	$4\overline{)19}$	$3\overline{)14}$
7.	$3\overline{)26}$	$4\overline{)22}$	$4\overline{)7}$	$4\overline{)27}$	$3\overline{)20}$	$3\overline{)29}$
8.	$4\overline{)18}$	$4\overline{)11}$	$4\overline{)31}$	$3\overline{)11}$	$4\overline{)0}$	$4\overline{)26}$
9.	$4\overline{)15}$	$4\overline{)39}$	$5\overline{)5}$	$5\overline{)6}$	$5\overline{)8}$	$5\overline{)7}$
10.	$5\overline{)9}$	$5\overline{)12}$	$5\overline{)13}$	$5\overline{)11}$	$5\overline{)14}$	$5\overline{)16}$
11.	$5\overline{)18}$	$5\overline{)17}$	$5\overline{)20}$	$5\overline{)19}$	$5\overline{)21}$	$5\overline{)24}$
12.	$5\overline{)26}$	$5\overline{)27}$	$5\overline{)29}$	$5\overline{)30}$	$5\overline{)32}$	$5\overline{)31}$
13.	$5\overline{)34}$	$5\overline{)33}$	$5\overline{)36}$	$5\overline{)38}$	$5\overline{)40}$	$5\overline{)37}$
14.	$5\overline{)49}$	$5\overline{)42}$	$5\overline{)44}$	$5\overline{)43}$	$5\overline{)45}$	$5\overline{)0}$

BUYING AT A FRUIT STAND

Play you are buying fruit for a school picnic. How much must you pay at this fruit stand for:

1. Three apples and 10 peaches?
2. Ten cherries and 2 pears?
3. Five melons and a grapefruit.
4. Two dozen bananas?
5. Two apples, 2 oranges, 2 bananas and 2 peaches?

How much change should you have if you gave the fruit dealer a 50-cent piece:

1. To pay for 2 melons?
2. To pay for a dozen bananas?
3. To pay for half a dozen oranges?
4. To pay for 16 cents worth of plums?
5. To pay for 2 grapefruit?

PROBLEM STUDY

First read a problem to yourself. Then read aloud a question about the problem and answer "yes" or "no."

1. Last week one class worked 18 examples. This week the class worked 12 examples. Give the number of examples the class worked in all.

Does the problem tell the number of examples worked each week?

Does the problem tell the number of examples worked in the two weeks?

2. There are 20 boys and 14 girls in a third grade class. How many pupils are there in the class?

Does the problem tell the number of boys and the number of girls in the class?

Are you asked to find the number of pupils?

Is this an addition problem?

3. There are 8 pupils in one row, 5 in another and 3 in another. How many pupils are there in the three rows?

Does the problem tell the number of pupils in each row?

Are there the same number in each row? Can you find the sum by adding?

4. Last week Henry saved 12 cents. This week he saved 15 cents. How much money did he save in the two weeks?

Did Henry save more money the second week than the first week?

TEST IN ADDING DOLLARS AND CENTS

Add from the bottom up. Then check by adding from the top down:

1.	\$181.75	\$778.78	\$827.09	\$936.46
	49.28	35.85	69.07	62.28
2.	\$396.97	\$675.56	\$427.86	\$352.89
	6.97	569.07	37.85	33.84
	447.38	87.88	861.99	17.27
3.	\$221.44	\$423.51	\$212.24	\$ 10.10
	40.71	491.22	306.47	3.15
	855.80	50.92	250.17	1.60
	761.29	16.34	792.40	62.55
4.	\$779.77	\$110.47	\$856.06	\$ 40.08
	94.96	37.39	598.56	4.36
	85.83	900.67	64.25	2.08
	546.35	64.79	722.29	84.69
5.	\$ 79.88	\$ 67.07	\$ 10.44	\$ 5.60
	97.47	84.68	4.65	.63
	98.76	65.96	52.11	.18
	67.15	49.96	42.91	.22
	58.08	65.48	56.97	6.60

Be sure to write \$ before each sum, and to separate dollars and cents with a decimal point.

TEST IN SUBTRACTION

Subtract without copying. Use a folded answer paper. See how many you can do in four minutes:

1.	875 171	543 323	843 489	934 135	956 546
2.	603 202	796 653	376 189	857 269	989 941
3.	636 377	297 162	731 346	915 729	6902 659
4.	1584 788	1212 433	1234 666	1056 258	1111 769
5.	1182 214	1143 466	1092 538	1000 688	9801 640
6.	1087 280	1280 997	9441 3401	7562 5512	7364 3151
7.	5478 2317	10352 996	13265 6676	1124 346	1852 873
8.	1514 828	1313 755	1756 867	1367 388	1344 885

THE TABLE OF SEVENS

Add columns of 7's to help you answer these questions.

When 1 box of crackers costs 7 cents, tell the cost of:

Two boxes.	$2 \times 7 = ?$	Seven boxes.	$7 \times 7 = ?$
Three boxes.	$3 \times 7 = ?$	Eight boxes.	$8 \times 7 = ?$
Four boxes.	$4 \times 7 = ?$	Nine boxes.	$9 \times 7 = ?$
Five boxes.	$5 \times 7 = ?$	Ten boxes.	$10 \times 7 = ?$
Six boxes.	$6 \times 7 = ?$		

Give the missing numbers:

Six 7's are ?	Five 7's are ?	Ten 7's are ?
Two 7's are ?	Nine 7's are ?	Four 7's are ?
Eight 7's are ?	Three 7's are ?	Seven 7's are ?

THE TABLE OF SEVENS

$1 \times 7 = 7$	$6 \times 7 = 42$
$2 \times 7 = 14$	$7 \times 7 = 49$
$3 \times 7 = 21$	$8 \times 7 = 56$
$4 \times 7 = 28$	$9 \times 7 = 63$
$5 \times 7 = 35$	$10 \times 7 = 70$
$0 \times 7 = 0$	$7 \times 0 = 0$

REVIEW THESE THREE MANY TIMES

$9 \times 7 = 63$ $8 \times 7 = 56$ $4 \times 7 = 28$

In the tables you have studied you have learned that:

$7 \times 2 = 14$	$7 \times 4 = 28$	$7 \times 6 = 42$
$7 \times 3 = 21$	$7 \times 5 = 35$	$7 \times 7 = 49$

Add:

8	9	10
8	9	10
8	9	10
8	9	10
8	9	10
8	9	10
8	9	10

How many are seven 8's? Seven 9's? Seven 10's?

Give the products:

$7 \times 8 = ?$	$8 \times 7 = ?$	$7 \times 9 = ?$	$9 \times 7 = ?$
$7 \times 10 = ?$	$10 \times 7 = ?$	$7 \times 4 = ?$	$4 \times 7 = ?$

Tell how much I must pay for:

Five 7-cent cups.	Seven 4-cent apples.
Ten 7-cent plates.	Seven 8-cent grapefruit.
Three 7-cent pans.	Seven 10-cent melons.
Eight 7-cent saucers.	Seven 6-cent oranges.
Six 7-cent bowls.	Seven 3-cent bananas.
Nine 7-cent spoons.	Seven 6-cent pears.
Seven 7-cent knives.	Seven 2-cent lemons.
Four 7-cent forks.	Seven 9-cent pineapples.
Two 7-cent glasses.	Seven 5-cent peaches.

Copy and multiply:

1. 38 × 7	2. 91 × 7	3. 73 × 7	4. 64 × 7	5. 90 × 7	6. 74 × 7
7. 275 × 7	8. 386 × 7	9. 128 × 7	10. 435 × 7	11. 244 × 7	12. 351 × 7
13. \$4.69 × 7	14. \$1.18 × 7	15. \$2.61 × 7	16. \$3.20 × 7	17. \$5.34 × 7	18. \$1.86 × 7

PROBLEMS

1. Fred is saving money to buy his mother a birthday present. There are 27 days before her birthday. If he saves 7¢ a day how much will he have?

2. Tom's father sold 7 puppies for \$35 each. How much money did he receive?

3. There are 42 windows in each story of a 7-story building. How many windows are there in the building?

4. Dick sold 7 quarts of tomatoes at 9 cents a quart. How much was he paid for them?

5. There are 7 days in a week. How many days are there in 52 weeks?

6. Alice is going to help her mother can cherries. They are using 44 pounds of sugar. At 7¢ a pound how much will the sugar cost?

7. Mary spent 7 weeks at the Girl Scout camp last summer. If she paid \$8 a week, how much did it cost?

DIVIDING BY SEVEN

Count by 7 to 70.

Count by 7 from 70 to 7.

There are 7 days in 1 week

14 days = ? weeks.	14 ÷ 7 = ?
21 days = ? weeks.	21 ÷ 7 = ?
28 days = ? weeks.	28 ÷ 7 = ?
35 days = ? weeks.	35 ÷ 7 = ?
42 days = ? weeks.	42 ÷ 7 = ?
49 days = ? weeks.	49 ÷ 7 = ?
56 days = ? weeks.	56 ÷ 7 = ?
63 days = ? weeks.	63 ÷ 7 = ?
70 days = ? weeks.	70 ÷ 7 = ?

REVIEW THESE THREE MANY TIMES

49 ÷ 7 = 7	**28 ÷ 7 = 4**	**63 ÷ 7 = 9**

Give the missing numbers:

63 = ? 7's	70 = ? 7's	56 = ? 7's
35 = ? 7's	49 = ? 7's	42 = ? 7's
14 = ? 7's	28 = ? 7's	21 = ? 7's

Divide:

$7\overline{)147}$	$7\overline{)497}$	$7\overline{)770}$	$7\overline{)217}$	$7\overline{)637}$
$7\overline{)490}$	$7\overline{)287}$	$7\overline{)210}$	$7\overline{)140}$	$7\overline{)357}$
$7\overline{)420}$	$7\overline{)567}$	$7\overline{)630}$	$7\overline{)350}$	$7\overline{)280}$

ONE-SEVENTH

A week is divided into 7 days. One day is what part of a week?

When anything is divided into seven equal parts, each part is called *one-seventh*.

One-seventh is written $\frac{1}{7}$

To find $\frac{1}{7}$ of a number, we divide the number by 7.

1. What is $\frac{1}{7}$ of 14 days?
2. What is $\frac{1}{7}$ of 21 apples?
3. What is $\frac{1}{7}$ of 28 candies?

Find each of the following:

$\frac{1}{7}$ of 42	$\frac{1}{7}$ of 70	$\frac{1}{7}$ of 56	$\frac{1}{7}$ of 28 pt.
$\frac{1}{7}$ of \$49	$\frac{1}{7}$ of 35c	$\frac{1}{7}$ of \$63	$\frac{1}{7}$ of 21 qt.

PROBLEMS

1. July has 31 days. How many weeks are there in July and how many days are left over?

2. June has 30 days. How many weeks are there in June and how many days are left over?

3. Betty's cat has 28 toes on his 4 feet. How many toes has he on each foot?

4. Helen painted 7 candlesticks and sold them at 60 cents each. How much did she receive for them?

5. Seven tickets to a moving picture house cost \$2.80. What was the price of a single ticket?

Begin with 7 and give the numbers to 63 which contain 7 without a remainder.

Give the answers:

$2 \times 7 + 3 = ?$	$2 \times 7 + 4 = ?$	$3 \times 7 + 1 = ?$
$3 \times 7 + 6 = ?$	$4 \times 7 + 2 = ?$	$6 \times 7 + 5 = ?$
$5 \times 7 + 6 = ?$	$3 \times 7 + 4 = ?$	$8 \times 7 + 3 = ?$
$7 \times 7 + 6 = ?$	$9 \times 7 + 5 = ?$	$8 \times 7 + 6 = ?$

Give the missing numbers:

1.	$1 \times 7 + 1 = ?$	$8 \div 7 = ?$ and ? remainder.
2.	$2 \times 7 + 2 = ?$	$16 \div 7 = ?$ and ? remainder.
3.	$3 \times 7 + 3 = ?$	$24 \div 7 = ?$ and ? remainder.
4.	$4 \times 7 + 2 = ?$	$30 \div 7 = ?$ and ? remainder.
5.	$5 \times 7 + 4 = ?$	$39 \div 7 = ?$ and ? remainder.
6.	$6 \times 7 + 5 = ?$	$47 \div 7 = ?$ and ? remainder.
7.	$7 \times 7 + 3 = ?$	$52 \div 7 = ?$ and ? remainder.
8.	$8 \times 7 + 3 = ?$	$59 \div 7 = ?$ and ? remainder.
9.	$9 \times 7 + 4 = ?$	$67 \div 7 = ?$ and ? remainder.

Subtract without copying:

8982	1009	9800	1149	7210
2758	544	6283	672	3848
1121	1382	1126	1128	11450
266	643	838	749	3777
1453	1333	1655	1374	17647
557	479	669	385	7896

A SPECIAL SALE OF TOYS

1. George bought 6 Christmas bells, a telephone and an automobile. How much did all cost?

2. For her Christmas tree Helen bought 3 Christmas bells, 4 horns, a horse and cart and 2 tree ornaments. How much did all cost?

3. For his camping outfit a Boy Scout bought 6 knives, 6 forks and 6 spoons. How much did all cost? How much change should he have received from a two dollar bill?

4. Ruth bought a dog, a pail and shovel and a tin plate for her baby brother. How much did she pay for all?

5. Fred bought 2 automobiles, a telephone and 3 knives. How much did all cost?

6. William bought a ball, 5 tree ornaments and 2 boats. How much did he pay for all?

7. George bought 3 bags of marbles and 2 puzzles. How much did they cost?

8. Anna bought 4 domino sets, 6 story-books and 3 checker-boards. How much did she pay for all?

9. Frank's father bought one of each kind of article in the list. How much did all cost?

DRILL IN DIVISION

Read across the page. Say the quotients and remainders. Choose sides and see which side will make the better score. If a pupil fails to give the right answer it counts against his side.

1.	$6\overline{)6}$	$6\overline{)7}$	$6\overline{)8}$	$6\overline{)9}$	$6\overline{)10}$	$6\overline{)11}$
2.	$6\overline{)12}$	$6\overline{)14}$	$6\overline{)13}$	$6\overline{)15}$	$6\overline{)17}$	$6\overline{)18}$
3.	$6\overline{)19}$	$6\overline{)20}$	$6\overline{)22}$	$6\overline{)21}$	$6\overline{)23}$	$6\overline{)24}$
4.	$6\overline{)25}$	$6\overline{)27}$	$6\overline{)26}$	$6\overline{)28}$	$6\overline{)29}$	$6\overline{)30}$
5.	$6\overline{)32}$	$6\overline{)31}$	$6\overline{)33}$	$6\overline{)34}$	$6\overline{)36}$	$6\overline{)35}$
6.	$6\overline{)37}$	$6\overline{)38}$	$6\overline{)40}$	$6\overline{)39}$	$6\overline{)41}$	$6\overline{)42}$
7.	$6\overline{)43}$	$6\overline{)45}$	$6\overline{)44}$	$6\overline{)46}$	$6\overline{)49}$	$6\overline{)48}$
8.	$6\overline{)50}$	$6\overline{)51}$	$6\overline{)53}$	$6\overline{)52}$	$6\overline{)54}$	$6\overline{)55}$
9.	$7\overline{)8}$	$7\overline{)9}$	$7\overline{)10}$	$7\overline{)11}$	$7\overline{)12}$	$7\overline{)13}$
10.	$7\overline{)14}$	$7\overline{)21}$	$7\overline{)15}$	$7\overline{)16}$	$7\overline{)19}$	$7\overline{)18}$
11.	$7\overline{)17}$	$7\overline{)20}$	$7\overline{)28}$	$7\overline{)23}$	$7\overline{)22}$	$7\overline{)24}$
12.	$7\overline{)25}$	$7\overline{)26}$	$7\overline{)35}$	$7\overline{)27}$	$7\overline{)29}$	$7\overline{)30}$
13.	$7\overline{)32}$	$7\overline{)34}$	$7\overline{)36}$	$7\overline{)31}$	$7\overline{)37}$	$7\overline{)40}$
14.	$7\overline{)42}$	$7\overline{)41}$	$7\overline{)45}$	$7\overline{)43}$	$7\overline{)47}$	$7\overline{)49}$
15.	$7\overline{)51}$	$7\overline{)46}$	$7\overline{)60}$	$7\overline{)65}$	$7\overline{)69}$	$7\overline{)57}$

ZERO IN THE DIVIDEND

If an iceman cut a block of ice weighing 204 pounds into 2 equal pieces, how many pounds would each piece weigh?

We find the weight of each piece by dividing.

```
        2 is contained in 2 once.  Write 1.
 102    2 is contained in 0 no times.  Write 0.
2)204   2 is contained in 4 two times.  Write 2.
          Each piece would weigh 102 pounds.
```

Remember: $0 \div 2 = 0$ $0 \div 4 = 0$

Find the quotients:

1. $402 \div 2 = ?$ $306 \div 3 = ?$ $804 \div 4 = ?$
2. $208 \div 2 = ?$ $604 \div 2 = ?$ $808 \div 4 = ?$
3. $404 \div 2 = ?$ $608 \div 2 = ?$ $909 \div 3 = ?$

PROVING DIVISION WITH A REMAINDER

Divide 489 by 4.

To prove division with a remainder, multiply the **quotient** by the **divisor** and add the **remainder.** If the answer equals the **dividend** the division is correct.

quotient 122 and 1 **remainder**
divisor 4)489 **dividend**

Proof:

```
 122
   4
 488
   1
 489
```

Divide and prove:

1.	$227 \div 2 = ?$	$645 \div 2 = ?$	$809 \div 4 = ?$
2.	$463 \div 2 = ?$	$637 \div 3 = ?$	$825 \div 2 = ?$
3.	$334 \div 3 = ?$	$667 \div 3 = ?$	$885 \div 4 = ?$

PROBLEMS

1. In Polly's school there are 485 pupils. They march out in twos. How many twos are there?

2. When the 485 children march four in a row, how many rows are there?

3. There are 208 girls in this school. One-half of them use one door and one-half another. How many use each door?

4. At an ice cream social at Polly's school 887 people were served at one time. How many tables were used if there were places for 4 at a table?

5. If one quart of ice cream served 8 people, how many quarts of ice cream were needed for 887 people?

6. The school yard is 275 feet long. How many yards is that?

7. The school yard is 151 feet wide. How many yards is that?

8. There were 166 boys at the scout camp last summer. Each tent held 4 boys. How many tents were there?

9. In the mess hall there were places for 8 boys at each table. One day there were 169 boys in camp. How many tables did they use?

ADDITION DRILL

Copy and add:

1.	210	209	758	101	497
	890	880	479	555	511
	499	777	185	866	751
	290	107	160	473	211
	681	399	766	566	425
	309	402	429	188	535
2.	204	570	286	505	380
	333	572	896	200	574
	564	889	677	213	51
	337	672	899	466	344
	234	720	289	354	377
	560	958	697	373	348
3.	590	985	657	324	471
	819	73	649	989	241
	780	680	594	601	360
	742	112	892	923	767
	276	501	339	211	921
	360	832	689	517	409
4.	400	780	797	617	534
	50	318	886	932	200
	832	439	986	496	735
	966	208	488	279	456
	540	820	860	607	518
	455	777	396	679	479

TEST IN SUBTRACTION

Copy and subtract. See how many you can do in four minutes:

1.	5077	8638	5543	9214	9562
	1071	4631	3422	1114	9512
2.	9648	4963	7576	1260	9878
	8517	3531	5264	611	3632
3.	7916	9800	9390	9540	8220
	2220	6717	3994	6995	3894
4.	7780	10001	9412	11823	15011
	3996	2790	1648	8436	5287
5.	14326	15212	15148	16313	16775
	5668	7235	8279	6755	9787
6.	13443	9208	10029	10078	9271
	8844	6860	3504	7903	1840
7.	9413	8211	15610	12342	18251
	1646	4377	5783	8655	8274
8.	14153	11361	17763	8443	10000
	7285	5777	8784	4589	8899

PROBLEMS WITHOUT NUMBERS

1. Bob and Betty are putting picture postcards in their albums. Some of the cards belong to Betty and some to Bob. If you know how many each has, how can you tell how many there are in all?

2. Bob said, "I have more cards than you have, Betty." If you know how many each has, how can you find out how many more Bob has than Betty?

3. Betty has put the same number of cards on each page in her album. If you know the number of pages she has filled and the number of cards on a page, how can you tell how many cards there are in the book?

4. Bob has a few more pages to fill in his album. He counted the pages and then counted the cards he had left. How can he tell how many cards he must put on a page to get them all in?

5. Bob and Betty had to go to bed before they finished. They counted the cards they had left. If they knew how many they had in the beginning, how can they tell how many they had put in their books?

READING AND WRITING LARGE NUMBERS

Read each of these numbers and tell how many units, tens, hundreds and thousands there are in each:

1,445 4,350 2,621 7,045 5,830

Write these numbers in figures:

One thousand, two hundred sixty four.

Five thousand, three hundred thirty-six.

Three thousand, five hundred.

Four thousand, two hundred.

One thousand is written 1,000.

Ten thousand is written 10,000.

One hundred thousand is written 100,000.

5 = 5 **units** 10 = 1 **ten** 200 = 2 **hundreds** 7,000 = 7 **thousands** 20,000 = 2 **ten-thousands** 700,000 = 7 **hundred-thousands** 727,215	In every whole number the right-hand figure is **units.** The next is **tens.** The next is **hundreds.** The next is **thousands.** The next is **ten-thousands.** The next is **hundred-thousands.**

Read each of these numbers and tell how many units, tens, hundreds, thousands, ten-thousands and hundred-thousands there are in each.

25,000	53,475	68,354	70,280
200,000	825,350	727,215	901,875

THE TABLE OF EIGHTS

One peck equals 8 quarts	
Two pecks = ? quarts	$2 \times 8 = ?$
Three pecks = ? quarts	$3 \times 8 = ?$
Four pecks = ? quarts	$4 \times 8 = ?$
Five pecks = ? quarts	$5 \times 8 = ?$
Six pecks = ? quarts	$6 \times 8 = ?$
Seven pecks = ? quarts	$7 \times 8 = ?$
Eight pecks = ? quarts	$8 \times 8 = ?$
Nine pecks = ? quarts	$9 \times 8 = ?$
Ten pecks = ? quarts	$10 \times 8 = ?$

Give the missing numbers:

Two 8's are ?	Ten 8's are ?	Six 8's are ?
Five 8's are ?	Four 8's are ?	Three 8's are ?
Seven 8's are ?	Nine 8's are ?	Eight 8's are ?

THE TABLE OF EIGHTS

$1 \times 8 = 8$	$6 \times 8 = 48$
$2 \times 8 = 16$	$7 \times 8 = 56$
$3 \times 8 = 24$	$8 \times 8 = 64$
$4 \times 8 = 32$	$9 \times 8 = 72$
$5 \times 8 = 40$	$10 \times 8 = 80$
$0 \times 8 = 0$	$8 \times 0 = 0$

REVIEW THESE THREE MANY TIMES

$7 \times 8 = 56$ $6 \times 8 = 48$ $0 \times 8 = 0$

In the tables you have studied you have learned that:

$8 \times 2 = 16$ $8 \times 4 = 32$ $8 \times 6 = 48$ $8 \times 8 = 64$
$8 \times 3 = 24$ $8 \times 5 = 40$ $8 \times 7 = 56$

How many are eight 9's? Eight 10's?

If you cannot answer these questions, add eight 9's and eight 10's to help you.

Give the products:

$8 \times 9 = ?$ $9 \times 8 = ?$ $8 \times 10 = ?$ $10 \times 8 = ?$

Tell how much I must pay for:

Three 8-cent dolls.
Six 8-cent engines.
Four 8-cent trains.
Ten 8-cent horns.
Two 8-cent whistles.
Nine 8-cent boats.
Seven 8-cent pails.
Five 8-cent tops.

Eight 4-cent pads.
Eight 10-cent rulers.
Eight 6-cent crayons.
Eight 9-cent pans.
Eight 7-cent note books.
Eight 3-cent erasers.
Eight 5-cent pencils.
Eight 8-cent car tickets.

Copy and multiply:

1.	192 × 8	2.	175 × 8	3.	181 × 8	4.	178 × 8	5.	254 × 8	6.	328 × 8
7.	243 × 8	8.	266 × 8	9.	969 × 8	10.	265 × 8	11.	283 × 8	12.	205 × 8

13. $\$546 \times 8 = ?$ 14. $\$173 \times 8 = ?$

15. $\$583 \times 8 = ?$ 16. $\$415 \times 8 = ?$

DIVIDING BY EIGHT

Count by 8's to 80.

Count by 8's from 80 to 8.

When 8 boys march in a row:

16 boys will make ? rows.	$16 \div 8 = ?$
24 boys will make ? rows.	$24 \div 8 = ?$
32 boys will make ? rows.	$32 \div 8 = ?$
40 boys will make ? rows.	$40 \div 8 = ?$
48 boys will make ? rows.	$48 \div 8 = ?$
56 boys will make ? rows.	$56 \div 8 = ?$
64 boys will make ? rows.	$64 \div 8 = ?$
72 boys will make ? rows.	$72 \div 8 = ?$
80 boys will make ? rows.	$80 \div 8 = ?$

REVIEW THESE THREE MANY TIMES

$56 \div 8 = 7$ $64 \div 8 = 8$ $48 \div 8 = 6$

Give the missing numbers:

$40 =$? 8's	$48 =$? 8's	$72 =$? 8's
$80 =$? 8's	$64 =$? 8's	$16 =$? 8's
$24 =$? 8's	$32 =$? 8's	$56 =$? 8's

Divide and prove:

$8\overline{)16}$	$8\overline{)8}$	$8\overline{)80}$	$8\overline{)56}$	$8\overline{)40}$
$8\overline{)32}$	$8\overline{)48}$	$8\overline{)24}$	$8\overline{)72}$	$8\overline{)64}$
$8\overline{)248}$	$8\overline{)408}$	$8\overline{)168}$	$8\overline{)880}$	$8\overline{)328}$

$728 \div 8 = ?$ $648 \div 8 = ?$ $808 \div 8 = ?$ $560 \div 8 = ?$

ONE-EIGHTH

Fred's mother cut a bar of chocolate into 8 pieces of the same size and gave him one of the pieces. What part of the bar did she give him?

When anything is divided into 8 equal parts, each part is called *one-eighth*.

One-eighth is written $\frac{1}{8}$

To find $\frac{1}{8}$ of a number we divide the number by 8.

What is $\frac{1}{8}$ of 16 cents? Of 24 cents?

Find each of the following:

$\frac{1}{8}$ of 40	$\frac{1}{8}$ of 80	$\frac{1}{8}$ of 56	$\frac{1}{8}$ of 48
$\frac{1}{8}$ of \$64	$\frac{1}{8}$ of 32¢	$\frac{1}{8}$ of 72 gal.	$\frac{1}{8}$ of 24 bu.

How many eighths are $\frac{1}{8} + \frac{1}{8} + \frac{1}{8}$?

How many eighths are $\frac{3}{8} - \frac{1}{8}$?

PROBLEMS

1. At \$8 apiece how many baseball suits can you buy for \$56?

2. If 8 Boy Scouts marched in a row on parade, how many rows would 32 boys make?

3. There are 5 days before vacation. If the class reads 8 pages every day, how many pages will they read before vacation?

4. Louise bought 8 Christmas cards for 56 cents. How much did each cost?

5. John worked 3 hours a day for 8 days. How many hours did he work in all?

DIVISION

Mother paid \$9.60 for three sweaters. What was the price of each? We find the price of each sweater by dividing.

\$3.20 3)\$9.60	3 is contained in 9 three times. Where should you write the first figure of the quotient?
Proof: \$3.20 ×3 \$9.60	3 is contained in 6 two times. Where should you write the second figure of the quotient? 3 is contained in 0 no times. Write 0 over 0. Each sweater cost \$3.20.

DIVISION WITH CARRYING

It took 258 bricks to make 3 rows of a wall. How many bricks were in each row? We find the number of bricks in each row by dividing.

86 3)258	3 is contained in 25 eight times with 1 remainder. Write 8 over the 5. Think 1 before 8, making 18.
Proof: 86 ×3 258	3 is contained in 18 six times. Write 6 over the 8. There were 86 bricks in each row.

Find the quotients and prove:

1. 2)\$20.40
2. 3)\$2.10
3. 4)\$24.80
4. 4)\$20.80
5. 7)\$13.44
6. 3)\$15.45
7. 4)\$18.08
8. 4)\$29.88
9. 4)2876
10. 3)2019
11. 4)\$16.72
12. 4)1836

THE VALENTINE PARTY

We had lots of fun at the valentine party in our school. This is the way we planned it.

1. Seven girls stayed after school to make decorations. When they finished, they had made 217 decorations. How many had each girl made if each made the same number?

2. Four of the boys stayed to draw a border of hearts on the blackboards. Tom made hearts with red chalk, Bob with blue, Paul with white and Dick with yellow. They made 96 hearts. If each made the same number, how many hearts were there of each color?

3. Each child brought 7¢ for refreshments. There were 49 in our room. How much did all bring?

4. The teacher ordered six quarts of ice cream at 55¢ a quart. How much did the ice cream cost?

5. Ruth served the ice cream. She served 48 people with the six quarts. How many people did she serve with each quart?

DRILL IN DIVISION

Choose sides and see which side will make the better score. Read across the page. Give the quotients and the remainders:

1.	$8\overline{)8}$	$8\overline{)9}$	$8\overline{)10}$	$8\overline{)12}$	$8\overline{)14}$	$8\overline{)16}$
2.	$8\overline{)11}$	$8\overline{)13}$	$8\overline{)18}$	$8\overline{)15}$	$8\overline{)19}$	$8\overline{)17}$
3.	$8\overline{)21}$	$8\overline{)23}$	$8\overline{)24}$	$8\overline{)20}$	$8\overline{)22}$	$8\overline{)25}$
4.	$8\overline{)27}$	$8\overline{)29}$	$8\overline{)26}$	$8\overline{)28}$	$8\overline{)31}$	$8\overline{)32}$
5.	$8\overline{)30}$	$8\overline{)34}$	$8\overline{)36}$	$8\overline{)37}$	$8\overline{)33}$	$8\overline{)38}$
6.	$8\overline{)35}$	$8\overline{)39}$	$8\overline{)40}$	$8\overline{)42}$	$8\overline{)44}$	$8\overline{)41}$
7.	$8\overline{)46}$	$8\overline{)43}$	$8\overline{)47}$	$8\overline{)45}$	$8\overline{)48}$	$8\overline{)50}$
8.	$8\overline{)52}$	$8\overline{)49}$	$8\overline{)54}$	$8\overline{)51}$	$8\overline{)55}$	$8\overline{)56}$
9.	$8\overline{)59}$	$8\overline{)53}$	$8\overline{)61}$	$8\overline{)57}$	$8\overline{)58}$	$8\overline{)62}$
10.	$8\overline{)60}$	$8\overline{)63}$	$8\overline{)64}$	$8\overline{)67}$	$8\overline{)68}$	$8\overline{)65}$
11.	$8\overline{)70}$	$8\overline{)66}$	$8\overline{)69}$	$8\overline{)71}$	$8\overline{)0}$	$8\overline{)72}$
12.	$8\overline{)73}$	$8\overline{)75}$	$8\overline{)74}$	$8\overline{)77}$	$8\overline{)76}$	$8\overline{)79}$

MULTIPLYING BY NUMBERS ENDING IN ZERO

What is the weight of 20 boxes of crackers if each box weighs 14 pounds?

We find the weight by multiplying.

14 20 280	See where we place the 0 of the multiplier. We write 0 in the product under the 0 in the multiplier. Then we multiply 4 by 2 and write the 8 under the 2. Then we multiply 1 by 2 and write 2 under the 1. The 20 boxes weigh 280 pounds.

Find the products:

14 20	32 30	44 20	39 30	19 20	42 50
72 200	83 300	59 200	67 400	89 500	94 700

Subtract without copying:

1484 940	556 503	420 311	1070 191	626 204	708 158
918 420	1218 607	779 353	1365 867	1537 839	1467 488

PROBLEM STUDY

Read:

If one bag of marbles costs 5 cents, two bags of marbles will cost 2 times 5 cents, or 10 cents.

If one ice cream cone costs 5 cents, 4 ice cream cones will cost 4 times 5 cents, or 20 cents.

If one orange costs 4 cents, 6 oranges will cost 6 times 4 cents, or 24 cents.

Complete these problems in the same way:

1. If one bottle of milk costs 5¢, six bottles will cost ?

2. If one doll costs 18¢, seven dolls will cost ?

3. If one dozen oranges costs 25¢, two dozen will cost ?

4. If one quart of milk costs 15¢, ten quarts will cost ?

5. If one dozen eggs costs 50¢, two dozen will cost ?

Read:

If one dozen apples costs 20 cents, one-half dozen will cost one-half of 20¢, or 10 cents.

Complete these problems in the same way:

1. If one dozen oranges costs 30 cents, $\frac{1}{2}$ dozen will cost ?

2. If one pound of candy costs 20¢, $\frac{1}{4}$ pound will cost ?

3. If one quart of milk costs 14 cents, 1 pint of milk will cost ?

THE TABLE OF NINES

When one tart costs 9 cents,

Two tarts cost	? cents.	$2 \times 9 = ?$
Three tarts cost	? cents.	$3 \times 9 = ?$
Four tarts cost	? cents.	$4 \times 9 = ?$
Five tarts cost	? cents.	$5 \times 9 = ?$
Six tarts cost	? cents.	$6 \times 9 = ?$
Seven tarts cost	? cents.	$7 \times 9 = ?$
Eight tarts cost	? cents.	$8 \times 9 = ?$
Nine tarts cost	? cents.	$9 \times 9 = ?$
Ten tarts cost	? cents.	$10 \times 9 = ?$

Give the missing numbers:

Three 9's are ?	Two 9's are ?	Nine 9's are ?
Ten 9's are ?	Eight 9's are ?	Four 9's are ?
Five 9's are ?	Six 9's are ?	Seven 9's are ?

THE TABLE OF NINES

$1 \times 9 = 9$	$6 \times 9 = 54$
$2 \times 9 = 18$	$7 \times 9 = 63$
$3 \times 9 = 27$	$8 \times 9 = 72$
$4 \times 9 = 36$	$9 \times 9 = 81$
$5 \times 9 = 45$	$10 \times 9 = 90$
$0 \times 9 = 0$	$9 \times 0 = 0$

REVIEW THESE THREE MANY TIMES

$6 \times 9 = 54$ $7 \times 9 = 63$ $4 \times 9 = 36$

In the tables you have studied you have learned that:

$9 \times 2 = 18$	$9 \times 5 = 45$	$9 \times 8 = 72$
$9 \times 3 = 27$	$9 \times 6 = 54$	$9 \times 9 = 81$
$9 \times 4 = 36$	$9 \times 7 = 63$	

Count by 10's to 90. How many are ten 9's?

Give the products: $9 \times 10 = ?$ $10 \times 9 = ?$

Tell how much I must pay for:

Four 9-cent melons.
Six 9-cent note books.
Ten 9-cent knives.
Five 9-cent cakes.
Two 9-cent plates.
Eight 9-cent pies.
Three 9-cent pans.
Nine 9-cent tablets.

Nine 2-cent marbles.
Nine 10-cent pies.
Nine 7-cent cream puffs.
Nine 6-cent tarts.
Nine 8-cent brushes.
Nine 4-cent stamps.
Nine 3-cent tops.
Nine 5-cent lollipops.

Copy and multiply:

1.	118 × 9	2.	329 × 9	3.	241 × 9	4.	970 × 9	5.	233 × 9	6.	441 × 9
7.	267 × 9	8.	259 × 9	9.	407 × 9	10.	865 × 9	11.	386 × 9	12.	232 × 9
13.	907 × 9	14.	430 × 9	15.	303 × 9	16.	245 × 9	17.	674 × 9	18.	280 × 9

DIVIDING BY NINE

Count by 9's to 90.

Count by 9's from 90 to 9.

9 boys play on the school baseball nine.

18 boys would make ? nines.	$18 \div 9 = ?$
27 boys would make ? nines.	$27 \div 9 = ?$
36 boys would make ? nines.	$36 \div 9 = ?$
45 boys would make ? nines.	$45 \div 9 = ?$
54 boys would make ? nines.	$54 \div 9 = ?$
63 boys would make ? nines.	$63 \div 9 = ?$
72 boys would make ? nines.	$72 \div 9 = ?$
81 boys would make ? nines.	$81 \div 9 = ?$
90 boys would make ? nines.	$90 \div 9 = ?$

Give the missing numbers:

$81 = ?$ 9's	$27 = ?$ 9's	$72 = ?$ 9's
$54 = ?$ 9's	$45 = ?$ 9's	$18 = ?$ 9's
$36 = ?$ 9's	$90 = ?$ 9's	$63 = ?$ 9's

REVIEW THESE THREE MANY TIMES

$9 \div 9 = 1$ $\quad 63 \div 9 = 7$ $\quad 36 \div 9 = 4$

Divide and prove:

1.	$9\overline{)189}$	$9\overline{)459}$	$9\overline{)639}$	$9\overline{)909}$	$9\overline{)549}$
2.	$9\overline{)630}$	$9\overline{)270}$	$9\overline{)360}$	$9\overline{)810}$	$9\overline{)720}$
3.	$9\overline{)990}$	$9\overline{)180}$	$9\overline{)450}$	$9\overline{)279}$	$9\overline{)819}$

ONE-NINTH

There are 9 players on a baseball team. One player is what part of the whole team?

When anything is divided into 9 equal parts, each part is called *one-ninth.*

One-ninth is written $\frac{1}{9}$

To find $\frac{1}{9}$ of a number we divide the number by 9.

1. What is $\frac{1}{9}$ of 18 oranges?

2. What is $\frac{1}{9}$ of 27 dollars?

Find each of the following:

$\frac{1}{9}$ of 36 = ? $\frac{1}{9}$ of 54 = ? $\frac{1}{9}$ of 45 = ? $\frac{1}{9}$ of 81 = ?

$\frac{1}{9}$ of 90 = ? $\frac{1}{9}$ of 72 = ? $\frac{1}{9}$ of 63 = ? $\frac{1}{9}$ of 27 = ?

PROBLEMS

1. A postman delivered 416 letters in the morning and 207 in the afternoon. How many letters did he deliver that day?

2. A barrel of flour weighs 196 pounds. How much will 9 barrels weigh?

3. At 9 cents each how many tops can you buy for 81 cents?

4. A man pays $36 a month rent. What is his rent for 9 months?

5. There are 81 children in the third grade at Dick's school. $\frac{1}{9}$ of them were absent on Monday. How many were not there?

MEASURE OF WEIGHT

16 ounces (oz.) = 1 pound (lb.)

1. What things do you buy by weight? Did you ever lift an ounce weight? A 2-ounce weight? How many 1-ounce weights would be as heavy as a pound? How many 2-ounce weights?

2. John asked the butcher for a pound of steak. The butcher cut off a piece that weighed $1\frac{1}{4}$ pounds. How many ounces more than a pound was that?

3. When Jane had a birthday party, her mother bought a pound of candies and put equal amounts into little baskets. If eight children were there, how many ounces were there in each basket?

4. The school doctor weighed everybody in the third grade. Mary weighed $85\frac{1}{2}$ pounds. He wrote in his book: Mary—weight, 85 lbs. 8 oz. Write these weights in pounds and ounces:

John—$96\frac{1}{2}$ pounds. Nan—$73\frac{1}{4}$ pounds. Tom—$101\frac{1}{4}$ pounds.

DRILL IN DIVISION

Choose sides and see which side will make the better score. Read across the page. Give the quotients and the remainders:

1.	$9\overline{)9}$	$9\overline{)10}$	$9\overline{)11}$	$9\overline{)12}$	$9\overline{)13}$	$9\overline{)14}$
2.	$9\overline{)15}$	$9\overline{)16}$	$9\overline{)17}$	$9\overline{)18}$	$9\overline{)19}$	$9\overline{)20}$
3.	$9\overline{)22}$	$9\overline{)21}$	$9\overline{)23}$	$9\overline{)35}$	$9\overline{)25}$	$9\overline{)24}$
4.	$9\overline{)26}$	$9\overline{)28}$	$9\overline{)30}$	$9\overline{)32}$	$9\overline{)34}$	$9\overline{)36}$
5.	$9\overline{)27}$	$9\overline{)29}$	$9\overline{)31}$	$9\overline{)33}$	$9\overline{)37}$	$9\overline{)39}$
6.	$9\overline{)40}$	$9\overline{)42}$	$9\overline{)44}$	$9\overline{)45}$	$9\overline{)41}$	$9\overline{)43}$
7.	$9\overline{)46}$	$9\overline{)47}$	$9\overline{)48}$	$9\overline{)50}$	$9\overline{)49}$	$9\overline{)51}$
8.	$9\overline{)52}$	$9\overline{)54}$	$9\overline{)56}$	$9\overline{)58}$	$9\overline{)57}$	$9\overline{)55}$
9.	$9\overline{)53}$	$9\overline{)60}$	$9\overline{)62}$	$9\overline{)61}$	$9\overline{)64}$	$9\overline{)63}$
10.	$9\overline{)65}$	$9\overline{)67}$	$9\overline{)66}$	$9\overline{)68}$	$9\overline{)69}$	$9\overline{)70}$
11.	$9\overline{)72}$	$9\overline{)74}$	$9\overline{)76}$	$9\overline{)78}$	$9\overline{)79}$	$9\overline{)80}$
12.	$9\overline{)73}$	$9\overline{)82}$	$9\overline{)77}$	$9\overline{)0}$	$9\overline{)84}$	$9\overline{)90}$

PROBLEMS

1. How much will 9 two-cent stamps cost?

2. How much will 9 five-cent lollipops cost?

3. A baker baked 9 pans of biscuits. There were six in each pan. How many biscuits did he bake?

4. How many days are there in 9 weeks?

5. How many baseball nines will 45 players make?

6. The nine players on our baseball team had to pay 72¢ bus fare to go to the next town. How much did each ticket cost?

7. The suits for nine boys on our baseball team cost $90. How much did they cost apiece?

8. Clara has a yard of ribbon. How many inches long is it? She wishes to cut the ribbon into 9 bookmarks. How long will each piece be?

9. James bought 9 trolley tickets at 8 cents apiece. How much did he pay for all?

10. There are 9 bags of peaches on a counter. Each weighed 7 pounds. How much did all weigh?

11. A man traveled by automobile 154 miles one day, 209 miles the next day and 178 miles the third day. How many miles did he travel?

12. A man bought an automobile for $1525 and sold it for $850. How much did he lose?

13. Frank paid $3.60 for 9 rabbits. How much was this apiece?

14. Carl wants to buy a tie for 75 cents. If he has 2 quarters and a 5-cent piece, how much more money does he need?

MULTIPLYING BY 10 OR 100

1. The sum of three 10's = ?
2. The product of $3 \times 10 = ?$
3. The sum of three 100's = ?
4. The product of $3 \times 100 = ?$

$3 \times 10 = 30$ $\qquad$ $10 \times 3 = ?$

$3 \times 100 = 300$ $\qquad$ $100 \times 3 = ?$

You see that it makes no difference in the results which term of the multiplication is written first. That is, 3×10 gives the same answer as 10×3.

Give the products:

$4 \times 10 = ?$	$100 \times 3 = ?$	$6 \times 100 = ?$
$10 \times 4 = ?$	$3 \times 100 = ?$	$100 \times 6 = ?$
$8 \times 10 = ?$	$100 \times 7 = ?$	$9 \times 100 = ?$
$10 \times 8 = ?$	$7 \times 100 = ?$	$100 \times 9 = ?$

Read:

$10 \times 2 = 20$ $\qquad$ $100 \times 2 = 200$

$10 \times 5 = 50$ $\qquad$ $100 \times 5 = 500$

You can see that to multiply a number quickly by 10 you place 0 after the number.

Can you tell how to multiply a number quickly by 100?

When we place a zero after a number, we say we *annex* it.

> To multiply by 10, annex 1 zero.
> To multiply by 100, annex 2 zeros.

Give the products:

32	42	63	87	46	53	75
10	10	10	10	100	100	100

DIVIDING BY TEN

Say the Table of Tens.

Count by 10's to 100.

Count by 10's from 100 to 10.

There are 10 cents in 1 dime

In 20 cents there are ? dimes.	$20 \div 10 = ?$
In 30 cents there are ? dimes.	$30 \div 10 = ?$
In 40 cents there are ? dimes.	$40 \div 10 = ?$
In 50 cents there are ? dimes.	$50 \div 10 = ?$
In 60 cents there are ? dimes.	$60 \div 10 = ?$
In 70 cents there are ? dimes.	$70 \div 10 = ?$
In 80 cents there are ? dimes.	$80 \div 10 = ?$
In 90 cents there are ? dimes.	$90 \div 10 = ?$
In 100 cents there are ? dimes.	$100 \div 10 = ?$

Remember: $0 \div 10 = 0$

Give the missing numbers:

$90 = ?$ 10's	$80 = ?$ 10's	$70 = ?$ 10's
$60 = ?$ 10's	$50 = ?$ 10's	$30 = ?$ 10's
$40 = ?$ 10's	$20 = ?$ 10's	$100 = ?$ 10's

Divide the following:

$10\overline{)40}$	$10\overline{)100}$	$10\overline{)70}$	$10\overline{)50}$	$10\overline{)80}$
$10\overline{)20}$	$10\overline{)10}$	$10\overline{)30}$	$10\overline{)90}$	$10\overline{)60}$

ONE-TENTH

On Ruth's birthday her mother made a cake, which Ruth cut into 10 equal pieces. Each piece was what part of the whole cake?

When anything is divided into ten equal parts, each part is called *one-tenth*.

One-tenth is written $\frac{1}{10}$

To find $\frac{1}{10}$ of a number we divide the number by 10.

1. Julia is $\frac{1}{10}$ as old as her grandmother, who is 60. How old is Julia?

2. There are 40 pupils in our class. How many pupils are there in $\frac{1}{10}$ of the class?

Find each of the following:

$\frac{1}{10}$ of 50 = ? $\frac{1}{10}$ of 20 = ? $\frac{1}{10}$ of 30 = ?

$\frac{1}{10}$ of \$70 = ? $\frac{1}{10}$ of \$100 = ? $\frac{1}{10}$ of \$90 = ?

THE CHRISTMAS TREE

1. Mary helped her teacher pick out the presents for the class Christmas tree. They went to the Five and Ten Cent Store. They spent 80 cents for strings of beads, at 10 cents a string. How many strings did they buy?

2. For 90¢ they bought hard rubber balls at 10¢ each. How many balls did they buy?

3. They bought 7 boxes of tenpins for 10¢ each. How much did they cost?

MULTIPLYING BY TWO FIGURES

One gallon of ice cream will serve 26 people. How many people will 32 gallons serve?

We find out by multiplying.

26 32 52 78 832	First we multiply 26 by 2 and write 52 as we have been taught. Then we multiply 26 by 3 and write the 8 under the 3 by which we have multiplied. We add and find that the product is 832. Thirty-two gallons will serve 832 people.

Remember: We always write the right-hand figure of a product under the figure by which we are multiplying.

1. There are 48 seats in each row of a grandstand. How many seats are there in 25 rows?

2. A railroad car will carry 75 people. How many will 36 cars carry?

3. Frank's father is a clerk in a store and earns $38 a week. How much does he earn in 52 weeks?

4. A farmer shipped 96 crates of berries, each containing 32 quarts. How many quarts did he ship?

5. How many bushels of oats did a farmer grow on 28 acres, if each acre produced 29 bushels?

6. A merchant bought 45 pieces of cloth. Each piece contained 53 yards. How many yards did the merchant buy?

7. A dealer sold 24 large sleds at $13 apiece. For how much did all sell?

DRILL IN MULTIPLICATION

Copy and multiply:

1. 709 × 49	2. 105 × 52	3. 315 × 31	4. 360 × 24
5. 278 × 25	6. 319 × 49	7. 376 × 37	8. 930 × 56
9. 431 × 82	10. 201 × 71	11. 158 × 76	12. 498 × 37
13. 790 × 39	14. 968 × 86	15. 540 × 98	16. 327 × 69
17. 564 × 54	18. 489 × 67	19. 502 × 34	20. 468 × 91
21. 305 × 78	22. 506 × 89	23. 960 × 62	24. 687 × 48
25. 607 × 75	26. 648 × 79	27. 469 × 87	28. 748 × 69
29. 879 × 54	30. 978 × 35	31. 729 × 18	32. 987 × 48

MULTIPLYING BY THREE FIGURES

Mr. Rich bought a large piece of land and laid it out in 234 building lots and sold them at $245 a lot. How much did he receive for the lots? We find out by multiplying.

$245 234 980 735 490 $57,330	First we multiply 245 by 4 and write the 0 under the 4. Then we multiply 245 by 3 and write the 5 under the 3. Next we multiply by 2 and write the 0 under the 2. We add and find that the product is $57,330. The lots sold for $57,330.

Find the products:

1. 418×278	4. 382×412	7. 232×323
2. 376×163	5. 619×275	8. 432×712
3. 614×279	6. 446×515	9. 672×423

1. An air mail route is 864 miles long. How many miles are covered in flying the route 225 times?

2. During the year a fur dealer sold 316 fur coats at $275 each. How much did he receive for all the coats?

3. An automobile dealer sold 146 cars at $775 each. How much did he receive for all the cars?

ZERO IN THE MULTIPLIER

A dealer sold 373 pads each day for 205 days. How many pads did he sell? We find out by multiplying.

$$\begin{array}{r} 373 \\ 205 \\ \hline 1865 \\ 746 \\ \hline 76465 \end{array}$$

First we multiply 373 by 5 and write the 5 under the 5.

Then we multiply 373 by 0. When any number is multiplied by 0, the product is 0, so we omit this product.

Next we multiply by 2 and write the 6 under the 2.

We add and find that the product is 76,465.

The dealer sold 76,465 pads.

Multiply:

1. 422 × 106	2. 377 × 207	3. 544 × 503	4. 658 × 104	5. 318 × 301
6. 715 × 203	7. 455 × 306	8. 219 × 401	9. 222 × 701	10. 583 × 101

PROBLEMS

1. A candy shop man offered a prize to the person who could guess how many jelly beans there were in his window. Joan guessed that there were 325 bags with 207 beans in a bag. How many beans was that?

2. John said there were 412 bags with 207 in a bag. How many did he guess?

3. The candy man said neither guessed right. There were 225 bags with 308 in a bag. Which guess was nearer right?

Divide the numbers in each row by the number at the left of the row. See if you can give all the quotients in five minutes:

2	4	8	12	16	20	6	2	10	14	18
3	3	9	15	21	27	30	6	12	18	24
4	4	12	20	28	36	40	8	16	24	32
5	10	20	30	40	50	5	15	35	25	45
6	30	42	6	12	18	54	24	36	48	60
7	63	14	28	49	42	35	21	56	70	7
8	24	32	8	56	16	40	64	72	48	80
9	18	90	36	72	54	9	27	45	81	63

See how many you can do without a mistake in ten minutes:

$2\overline{)188}$	$7\overline{)574}$	$3\overline{)255}$	$4\overline{)333}$	$5\overline{)475}$	$6\overline{)504}$
$9\overline{)838}$	$2\overline{)115}$	$4\overline{)256}$	$3\overline{)207}$	$5\overline{)365}$	$7\overline{)582}$
$6\overline{)576}$	$8\overline{)496}$	$8\overline{)345}$	$9\overline{)639}$	$2\overline{)206}$	$5\overline{)405}$
$7\overline{)3948}$	$9\overline{)7758}$	$3\overline{)7293}$	$5\overline{)321}$	$2\overline{)5362}$	$4\overline{)3160}$
$4\overline{)1004}$	$9\overline{)5139}$	$8\overline{)4648}$	$8\overline{)7760}$	$3\overline{)210}$	$6\overline{)2233}$
$7\overline{)6790}$	$9\overline{)3600}$	$6\overline{)3060}$	$5\overline{)1050}$	$4\overline{)3905}$	$8\overline{)6289}$

TESTING OUR PROGRESS

This group of tests will help you measure your progress. You should be able to do any one of these tests in ten minutes.

Test I.

1. 857 + 104 + 327 + 512 + 509
2. 1810 − 888
3. 209 × 2
4. $2\overline{)1820}$
5. Grace's father bought her a coat for \$24.75 and a sweater for \$8.50. How much less did the sweater cost than the coat?

Test II.

1. 40 + 71 + 92 + 12 + 87 + 67
2. $4\overline{)2788}$
3. 7465 × 8
4. 10085 − 8328
5. A kindergarten class is given 36 crackers each day. How many crackers will be given out in 12 days?

Test III.

1. 746 + 989 + 289 + 975 + 605
2. 72321 − 36728
3. 4789 × 7
4. $7\overline{)5187}$
5. Mabel wants to buy a book that costs \$1.50. If she saves 5 cents each day, how many days will it take her to save enough money to buy the book?

Test IV.

1. 537
   691
   389
   725
   97
   468

2. $3\overline{)2945}$

3. 4738×9

4. $9846 - 2468$

5. If two boys divide 28 marbles equally, one boy will receive what part of the marbles?

Test V.

1. 84
   98
   44
   46
   67
   69

2. 789×64

3. $8\overline{)4248}$

4. $14321 - 5834$

5. Mary counted the money in her bank. She had 7 dimes, 8 nickels and 9 pennies. How much money did she have in all?

Test VI.

1. 101
   430
   494
   733
   933
   580

2. 908×80

3. $17365 - 8666$

4. $8\overline{)6289}$

5. A milk can contains 8 gallons of milk. How many quarts does it hold?

Test VII.

1. 953
   78
   472
   648
   89
   759

2. $13567 - 3688$

3. 606×97

4. $6\overline{)49884}$

5. When oranges cost 48 cents a dozen, how much will 9 dozen cost?

Test VIII. 1. 976
86
438
842
66
434

2. 879
×53

3. 15441
−8843

4. $9\overline{)3754}$

5. Fred spent 56 days of his vacation at his grandmother's farm. How many weeks was he there?

Test IX. 1. 929
639
302
311
960
566
530

2. 13311
−5465

3. 651
×60

4. $7\overline{)6729}$

5. A playground is 90 ft. long. How many yards long is this playground?

This is an extra credit test. See if you can do all the exercises.

Test X. 1. 2582
4819
8890
7542
5691
7901

2. 154221
−57486

3. 614
×15

4. $9\overline{)7785}$

5. Frank gave the grocer a five dollar bill in payment for groceries that cost $1.39. How much change was due him?

FOURTH GRADE

FIRST HALF

CIRCUS DAY

1. I have been to the circus!

I counted everything in the parade. There were 150 horses, 20 elephants, 16 clowns, 1 steam piano and 25 circus wagons. How many was that?

2. The programs were 25 cents each. 479 were sold. For how much money did they sell?

3. There were 3 rings and 17 acts in each ring. How many acts were there in all?

4. The balloon man had 1225 balloons. He sold 996. How many did he have left?

5. I went to 5 sideshows and spent one dollar. If all the tickets were the same price, how much did I pay for each?

READING AND WRITING NUMBERS

What is the largest number you can write with four figures? What is the smallest number you can write with five figures? What is the largest number you can write with five figures?

One hundred thousand is written 100,000.

Write two hundred thousand; three hundred thousand; four hundred thousand; five hundred thousand; six hundred thousand.

Read the following numbers:

125,000	235,366	505,000	742,150
147,450	440,000	542,100	890,000
186,312	362,410	678,325	953,465

Find in your geography the names of five cities whose population is written with six figures. Make a list of the cities and the number of people who live in each.

Write the following numbers in figures. Put commas in the right places:

1. One hundred eleven thousand, two hundred twenty-five.

2. Two hundred twenty thousand, five hundred sixty.

3. Five hundred forty-one thousand, three hundred.

4. Seven hundred ninety-six thousand, one hundred one.

5. Eight hundred thirty-seven thousand, three hundred.

ROMAN NUMERALS

1. The Romans used letters instead of figures in writing numbers. We call them Roman numerals.

I = 1 V = 5 X = 10 L = 50 C = 100

2. Sometimes we use Roman numerals to number chapters in books. See if they are used in any of your books.

3. Using a letter over again repeats its value.

III = 3 XX = 20 CCC = 300

Read: VIII, XXX, XXV, CC, CCXX, CXXII, CCXXV.

4. When a letter of less value is placed after a letter of greater value, their values are added.

VI = 6 XII = 12 LV = 55

Read: VII, XI, XV, LX, CL, CXV, LXVII, CLX.

5. When a letter of less value is placed before one of greater value, the value of the less is taken from the greater.

IV = 4 XL = 40 XC = 90.

Read: IX, IV, XL, XC, XLIII, XCV, XLIV, XCIV, XCIX.

6. Write in Roman numerals: 8, 9, 13, 14, 18, 25, 49, 75.

7. Write in figures: XI, XV, XX, XL, LV, XIX, LX, XCIV.

ADDITION DRILL

Begin at the bottom and add to the top. Then begin at the top and add downward. If you have the same result, you have proved or checked your addition.

1.	4	5	9	8	7	5	2	6	8
	5	6	5	7	4	1	5	5	4
	9	7	2	7	9	7	9	8	5
	5	4	1	5	6	8	7	6	8
2.	8	2	9	9	6	4	6	2	6
	9	0	8	3	7	8	8	7	7
	9	7	2	5	9	7	9	6	8
	5	4	1	7	6	8	7	8	5
3.	8	4	7	8	6	8	9	9	5
	5	4	6	6	9	7	6	8	6
	0	3	9	7	1	7	3	9	4
	6	9	6	2	6	9	9	6	2
	3	0	9	1	9	7	0	6	7
	7	2	6	3	6	6	2	1	8
	8	3	9	9	3	9	9	0	6
	5	4	1	6	6	0	8	8	7
	0	6	7	3	6	4	8	9	6
	9	2	3	9	4	7	9	4	7

The numbers to be added are called *addends*.

The result is called the *sum* or *amount*.

Finding the *sum* of two or more numbers is *addition*. The sign of addition is $+$.

ADDITION DRILL

Give these sums:

36	17	29	26	31	13	20	27
4	3	1	6	1	6	9	2

Copy, add and prove:

1.	37	89	4	64	9	69	37
	63	11	92	86	61	81	63
	14	17	16	43	49	47	16
	76	92	86	27	90	23	86
2.	16	36	38	69	58	41	50
	8	64	32	31	92	59	44
	29	12	50	16	32	14	13
	69	78	49	74	18	76	83
3.	62	98	20	10	66	92	48
	87	14	73	23	18	17	64
	41	42	66	67	24	31	92
	23	66	40	19	17	72	11
	16	86	99	71	67	97	91

4.	706	883	201	616	81	961
	338	247	59	98	429	189
	779	29	158	404	3	44
	79	910	72	974	296	726

TELLING TIME

1. Which hand of the clock tells the hour? Which hand tells the minutes?

2. How long does it take the short, or hour hand, to go from one figure to the next? How long does it take it to go all around the face of the clock?

3. How long does it take the long, or minute hand, to go from one figure to the next? How long does it take it to go all around the face of the clock?

60 seconds (sec.)	= 1 minute (min.)
60 minutes	= 1 hour (hr.)
24 hours	= 1 day (da.)

There are 12 hours shown on a clock face. There are 24 hours from one midnight to the next midnight, so the hour hand must go twice around the clock face each day.

Play Time

A. M. means *before noon.*

P. M. means *after noon.*

Bed Time

Fifteen minutes after nine is written 9:15.

Half past twelve is written 12:30.

Fifteen minutes of nine is written 8:45.

Has your school clock another hand beside the hour and minute hands? Do you know what it is called? What is its work in telling the time?

TIME PROBLEMS

1. How long does it take the hour hand to go from IX to XII?

2. How long does it take the minute hand to go from I to VI?

3. Recess is from 10:10 to 10:30 A. M. How many minutes is that?

4. Molly sleeps ten hours each night. If she goes to bed at 9 P. M., what times does she wake up?

5. I must study my arithmetic for half an hour. If I begin at 4:30 when will I be through?

6. I went to the movies at 7:10 and came out at 9:30. How long was I there?

7. Fred's party begins at 4:30. It will take 20 minutes to walk there. What time must I start?

8. My watch says 9:25. It is 10 minutes fast. What is the right time?

9. How many minutes are there in $\frac{1}{2}$ hour? In $\frac{1}{4}$ of an hour?

10. How do you write quarter past twelve in figures?

11. Mother reads to Molly every night for half an hour. She begins at quarter past seven. When does she stop?

12. Is there any difference between 4:45, quarter of five and fifteen minutes of 5?

13. Make clock faces that show where the hands are at 3:15, 5:20, 8:30, 10:35.

ADDITION DRILL

Give these sums:

16	35	20	13	19	24	32	10
2	3	8	5	8	3	5	7

Copy, add and prove:

1.	30	36	23	32	67	34	65
	58	20	5	34	20	71	43
	20	54	82	44	33	84	72
	62	83	30	98	95	29	36
	16	80	48	79	83	69	62
2.	11	30	98	75	88	17	97
	76	57	83	73	49	63	16
	23	43	69	32	43	39	77
	2	88	72	20	29	91	3
	75	69	56	48	58	67	64

3.	63	38	398	8	23
	922	574	782	742	394
	835	368	338	238	423
	290	272	702	123	368
	577	656	858	667	689

4. $76 + 745 + 82 + 1567.$ $70 + 38 + 65.$

$6 + 70 + 704 + 1067.$ $968 + 59 + 47.$

ADDITION DRILL

Give these sums:

29	17	6	22	17	39	16	28
7	9	30	4	8	6	9	7

Copy, add and prove:

1.	45	69	12	67	76	54	65
	65	41	98	43	34	56	45
	18	60	77	73	96	97	97
	37	86	78	82	50	49	58
2.	94	23	24	49	22	75	70
	86	47	46	20	34	33	81
	30	40	40	42	54	68	58
	32	23	76	88	30	41	73
	14	32	79	57	16	44	73

3.	9	931	56	54	896
	61	9	604	1	14
	940	170	450	955	240
	73	501	95	30	406
	482	45	360	616	9

4. $24 + 677 + 341 + 1538.$

$94 + 267 + 2669 + 3620.$

USING WHAT WE HAVE LEARNED

1. Read: 976,100; XLIV; 233,819; LVIII.

2. What do you do at 9:15 A. M.? Where are you usually at 9:15 P. M.?

3. When grandpa was a boy 170,845 people lived in our city. To-day 670,548 people live here. Has the population grown larger or smaller?

4. The last chapter in my book is numbered XXIV. I am ready to begin Chapter VII. How many chapters have I read? How many have I still to read?

5. There are three ways of saying the time shown on this clock face. Can you give them?

6. Let us go on a six-hour automobile trip. If we start at 10 A. M., when should we be back?

7. Add 100 to your age and write the number in Roman numerals.

8. Which is the larger number, XL or LX? CX or XC? Why?

9. Betty and Ruth tried to see how long they could keep from laughing. Betty kept still 48 seconds. How much less than a minute was that?

10. Ruth kept still 33 seconds. How much longer would she have to keep still, to be quiet for a minute?

11. Mary's train leaves at 9 A. M. and she reaches home at 5 P. M. How long will she be on the train?

ADDITION DRILL

Give these sums:

28	16	39	45	35	18	22	14
6	8	5	9	8	5	1	9

Copy, add and prove:

1.	60	60	64	78	10	64	24
	48	47	46	32	69	26	10
	92	93	70	90	41	20	76
	12	19	38	15	6	95	58
	21	25	15	29	18	38	66
2.	60	20	39	96	87	99	19
	17	79	71	94	23	71	81
	23	31	30	10	70	40	39
	12	97	87	88	64	87	89
	22	36	37	46	90	36	25

3.	980	510	10	852	513
	523	565	86	65	487
	687	45	624	245	20
	23	505	66	515	856
	231	718	258	769	477

4. $446 + 67 + 775 + 62 + 679.$

$107 + 616 + 670 + 7.$

ADDITION DRILL

Give these sums:

17	35	13	24	27	16	34	8
5	7	9	8	4	5	7	3

Copy, add and prove:

1.

40	31	43	41	48	20	67
79	48	22	41	31	32	50
91	32	45	29	31	58	93
72	81	33	75	83	56	77
29	30	69	36	19	55	35

2.

35	78	68	51	99	77	65
75	30	42	59	11	33	45
12	92	72	71	21	98	62
98	10	38	39	89	12	48
59	84	14	90	86	44	82
33	27	78	11	15	57	10

3.

88	402	721	902	501	305
502	8	289	8	649	3
4	773	175	88	6	77
527	29	836	214	65	825

4. $43 + 589 + 68 + 727.$

$107 + 554 + 459 + 6804.$

WHERE UNCLE SAM'S PAPER MONEY IS MADE

1. Name the United States silver coins.

2. The gold coins are the $2\frac{1}{2}$-dollar piece, the 5-dollar piece, the 10-dollar piece and the 20-dollar piece.

3. Which two United States coins are not made of silver or gold?

4. How many dimes are there in five dollars?

5. How many quarters are there in five dollars?

6. How many dollars are there in 20 dimes?

7. How many nickels are there in a dollar?

8. How many dollars are there in 40 nickels?

UNITED STATES MONEY

10 cents = 1 dime
10 dimes = 1 dollar

ADDING DOLLARS AND CENTS

John's father paid \$5.45 for a fishing rod, \$2.50 for a line and \$1.20 for some hooks. How much did he pay for all? We find out by adding.

\$5.45 2.50 1.20 \$9.15	Dollars and cents are added in just the same way that other numbers are added. When you write them to add, be sure that the decimal points are under each other. The dollar sign, \$, should be placed before the first number to be added and before the answer. A decimal point should always separate the dollars and cents.

Read: \$6.72, \$14.05, \$3.10, \$32.98, \$7.60, \$.16.

Write in figures, using the dollar sign and decimal point: Four dollars and nineteen cents. Two dollars. Six cents.

Copy and add:

1. \$4.15 + \$6.80 + \$7.05.
2. \$19.05 + \$30.16 + \$8.09.
3. \$8.15 + \$12.75 + \$5.90.
4. \$17.75 + \$4.16 + \$10.25 + \$4.12.
5. \$25.18 + \$9.09 + \$6.10 + \$30.15.
6. \$16.50 + \$4.10 + \$15.80 + \$4.60 + \$13.12.
7. \$8.90 + \$10.30 + \$4.16 + \$3.42 + \$40.70.

Make some problems about dollars and cents for your classmates to work.

TESTING YOURSELF IN ADDITION

Copy and add:

1.	57	66	50	59	83	79	86
	99	58	51	35	77	30	63
	94	89	25	20	81	91	33
	79	28	72	83	40	47	46
	68	99	34	25	79	63	20
2.	54	70	56	93	26	98	78
	54	96	75	97	86	99	82
	74	58	69	67	56	89	73
	49	79	38	78	68	47	78
3.	46	88	77	97	42	86	87
	46	29	99	19	86	55	38
	55	58	67	77	86	69	57
	69	59	59	48	79	58	58

4.	844	298	164	208	209	690
	847	726	759	458	76	297
	886	851	79	843	647	498
	85	96	779	45	856	79
	669	659	567	469	779	567
5.	678	797	549	904	760	448
	82	531	781	986	657	565
	268	652	76	798	53	537
	468	97	768	98	856	56
	457	264	259	647	467	749

PROBLEMS WITHOUT NUMBERS

1. Fred has to buy three articles at the store. If he knows the cost of each, how will he find the cost of all?

2. If I know how much money I had at first and how much I have spent, how can I find out how much I have left?

3. A boy buys a bat. If you know how much money he has now and also how much he had at first, how will you find the cost of the bat?

4. If I tell you how many dimes and nickels a boy has, how can you find the amount of his money?

5. If you know the cost of a pound of sugar and the cost of a box of cookies, how can you find the cost of both?

6. If you know the amount of money you have and also know the cost of an orange, how can you tell the amount of money you would have left if you bought the orange?

7. If you know the price of an apple, how would you find the cost of a dozen apples?

8. If you know the price of a quart of milk, how would you find the cost of a pint?

9. If you know the number of days in a week, how would you find the number of days in a given number of weeks?

10. If you know how many boys there are in a club and how many cents each one pays a week for dues, how can you tell how much money should be collected at each meeting?

SUBTRACTION DRILL

Give the missing numbers:

$13 - ? = 4$	$17 - ? = 9$	$11 - 6 = ?$
$14 - ? = 5$	$17 - ? = 8$	$13 - 5 = ?$
$14 - ? = 9$	$15 - ? = 8$	$15 - 9 = ?$
$13 - ? = 9$	$16 - 7 = ?$	$11 - 3 = ?$
$16 - ? = 7$	$13 - 8 = ?$	$14 - 8 = ?$

Subtract without copying. Use a folded answer paper:

1.

16	25	12	11	22	24	33	12
8	8	3	4	5	6	7	7

2.

25	30	31	11	21	18	12	23
6	3	9	7	8	5	4	6

3.

19	24	11	22	30	20	17	21
2	7	5	8	8	9	4	10

4.

18	17	28	30	22	19	12	29
3	10	20	6	9	7	10	4

5.

20	10	24	15	33	19	28	10
15	4	20	10	30	10	28	2

6.

18	15	13	17	14	16	14	13
9	7	4	8	9	9	5	9

THE MEASURE OF TIME

Here is a calendar for a year. How many months are there? Have they all the same number of days?

This rhyme will help you to remember the number of days in each month.

Thirty days hath September,
April, June and November.
All the rest have thirty-one,
Except February, which alone
Has twenty-eight
And one day more
When leap year comes one year
in four.

There are really 365¼ days in a year. Instead of counting this ¼ day each year, we add one whole day to every fourth year. We call this fourth year, which has 366 days, *leap year*. We add the extra day to February, which is the shortest month.

TABLE OF TIME

60 seconds (sec.)	= 1	minute (min.)
60 minutes	= 1	hour (hr.)
24 hours	= 1	day (da.)
7 days	= 1	week (wk.)
365 days	= 1	year (yr.)
12 months (mo.)	= 1	year

CALENDAR

	Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
Jan.	...	...	...	...	...	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	...	...	...	...	...	...
Feb.	...	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	...	...	...	...	...	...
March	...	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31	...	...	...
April	...	...	...	...	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	...
May	...	...	...	...	...	...	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	...	...	...	...	...
June	...	...	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	...	...	...
July	...	...	...	...	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	...	...	...	...	...	...	...
Aug.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	...	...	...	...
Sept.	...	...	...	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	...	...
Oct.	...	...	...	...	...	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	...	...	...	...	...	...
Nov.	...	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	...	...	...	...
Dec.	...	...	...	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	...

NOVEMBER						
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
..	..	..	..	..	..	..

DECEMBER						
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..
..	..	..	..	..	..	..

HOLIDAYS

1. Thanksgiving Day is the last Thursday in November. Find the date on this calendar.

2. If to-day is November 11th, how many days will there be before Thanksgiving Day?

3. Thanksgiving vacation lasts from Thursday until Monday. How many school days are there left in November after the vacation?

4. What holiday comes on the 25th of December? How many days are there between December 25th and New Year's Day?

5. Peggy is going Christmas shopping with her mother every Wednesday afternoon in December until Christmas. Find the dates on the calendar above.

6. Bob plans to buy one present each day except Sundays from December 15th to Christmas. How many presents will he buy?

7. Look at the calendar and tell how many days there are between Thanksgiving and Christmas.

SUBTRACTION DRILL

Give the remainders at sight:

10	75	26	20	11	38	29	60
0	4	8	3	1	1	4	8
23	36	69	13	81	16	45	99
7	9	9	0	4	0	2	0
94	27	46	39	61	58	14	15
9	9	5	8	8	4	0	5
12	11	18	14	15	15	14	13
5	5	9	8	8	6	6	8
10	29	11	12	18	91	78	17
5	5	4	6	0	0	7	3
24	13	10	10	36	52	77	26
3	5	1	2	2	0	0	4
38	10	10	11	14	49	27	12
3	9	3	7	7	2	4	9
11	12	11	13	18	12	11	12
3	7	6	6	5	3	9	4
87	98	20	39	28	32	50	70
6	2	7	7	6	8	6	4
16	13	15	15	17	13	17	14
7	9	9	7	9	4	8	5

HOW TO PROVE SUBTRACTION

We prove subtraction by adding the **subtrahend** and the **remainder.** If the sum equals the **minuend,** the subtraction is correct.

Subtraction:	Proof:
4308 **minuend.**	2165
2165 **subtrahend**	2143
2143 **difference or remainder**	4308

Finding the difference between two numbers is *subtraction.*

The sign of subtraction is —. It is read *minus.*

The number from which we subtract is the *minuend.*

The number that we subtract is the *subtrahend.*

The result in subtraction is called the *difference* or *remainder.*

Subtract without copying:

1.	1704	705	1403	2901
	879	468	877	654
2.	8040	7152	8035	6242
	3574	5293	1485	2854
3.	5535	2136	11468	9012
	3887	942	6669	1836
4.	8775	9091	9437	4672
	5836	7209	3452	3898
5.	2116	6021	8389	7200
	748	3466	4696	493

SUBTRACTION DRILL

Subtract and prove on a folded answer paper:

1.	1797	1343	1540	963
	989	349	687	367
2.	14921	16923	1105	12811
	6744	8567	826	4477
3.	1313	1050	14919	112580
	458	493	7432	32782
4.	828	11586	8189	12819
	557	8598	2690	4487
5.	12143	10120	7402	9173
	7466	6084	980	2220
6.	7677	10627	8605	85674
	3006	1158	2392	79353
7.	8463	4265	75403	83384
	4151	4215	70899	32405
8.	16766	15747	15635	14553
	9459	3918	9717	5828
9.	13311	12423	9145	12584
	5606	6805	299	2788

SUBTRACTING DOLLARS AND CENTS

Mary earned \$12.75 by picking strawberries, but she spent \$4.30 for a tennis racket. How much did she have left? We can find out by subtracting.

\$12.75 4.30 \$ 8.45	Dollars and cents are subtracted in just the same way that other numbers are subtracted. When you write them to subtract, be sure that the decimal points are under each other. The dollar sign should be placed before the first number and the answer, and the dollars and cents should be separated by a decimal point.

Copy and subtract:

1. \$14.48 minus \$6.25
2. \$50.34 minus \$10.40
3. \$74.18 minus \$22.56
4. \$36.75 minus \$20.64
5. \$64.43 minus \$41.95
6. \$54.16 minus \$28.22
7. \$36.20 minus \$16.15
8. \$42.70 minus \$24.36
9. \$45.37 minus \$27.49
10. \$51.49 minus \$33.94
11. \$54.20 minus \$48.67
12. \$83.52 minus \$64.77
13. \$38.00 minus \$18.64
14. \$91.20 minus \$40.10
15. \$65.15 minus \$28.05
16. \$38.15 minus \$14.10
17. \$57.64 minus \$20.20
18. \$74.92 minus \$30.85
19. \$24.46 minus \$10.10
20. \$89.50 minus \$30.25
21. \$45.60 minus \$20.34
22. \$51.93 minus \$36.37
23. \$29.24 minus \$20.86
24. \$42.71 minus \$34.88
25. \$68.56 minus \$49.47
26. \$80.94 minus \$52.96

EARNING AND SAVING MONEY

1. Harry has earned $2.15. How much more must he earn before he has enough to buy a pair of skates for $4.75?

2. Mildred has saved $1.12. How much more must she save to have enough to buy a doll for $2.25?

3. Will has saved $13.89. How much more must he save to have enough to buy a bicycle for $22.25?

4. George has saved $7.48. How much more must he save to buy a football suit for $12.45?

5. James is earning money to pay his expenses at a summer camp. The expenses will be $15. James has $4.75. How much more does he need?

6. Howard, Will and Tom are saving money for a camping trip. Howard has $4.10. Will has $5.16. Tom has $6.19. How much have the three boys saved?

7. Jane is saving money to go to a girls' camp. It will cost $12. She has saved $8.48. How much more must she save before she can go to the camp?

8. The pupils in a fourth grade class wanted to earn enough to buy a Victrola for $48.50. They gave an entertainment and raised $55.25. Was the sum they raised greater or less than the cost of the Victrola? What is the difference between the two amounts?

9. John worked during the summer to earn money to buy a $35 radio set. He earned $17.50. How much more did he need? Was the amount he earned greater or less than the amount he still needed?

A TEST IN SUBTRACTION

Work as many of these examples as you can in six minutes.

Subtract and prove:

1.	26346	69520	8111	80108
	18149	40764	5744	48919
2.	77922	21833	32309	69547
	4073	17356	28863	35878
3.	32910	63381	28993	91744
	20555	44709	17288	61897
4.	50585	31628	50254	93443
	27626	17640	22546	33489

ADDITION AND SUBTRACTION

Copy, add and prove:

1. 7068; 6963; 168; 7702; 95; 548.
2. 57; 5409; 6898; 645; 7092; 4221.
3. 7685; 8640; 849; 6301; 86; 9677.

Copy and find the answers:

1. 2443 — 489
2. 545 + 888
3. 8763 — 4789
4. 9657 — 1809
5. 787 + 779
6. 578 + 976
7. 649 + 2876
8. 1313 — 458
9. 7415 — 3729
10. 6837 + 4896
11. 11258 — 3279
12. 2894 + 7366

Here are the 100 multiplications. The easiest come first. Give the answers as quickly as you can:

1.	0	1	2	5	2	7	3	5	1	4
	0	5	2	1	9	1	1	2	7	1
2.	1	8	1	1	6	8	2	1	9	2
	3	1	4	2	1	2	8	9	2	3
3.	1	2	2	9	5	4	1	2	3	7
	6	7	5	1	5	5	8	1	2	2
4.	3	2	4	2	4	5	6	3	6	3
	3	6	2	4	4	3	2	4	3	5
5.	5	6	4	4	5	5	3	3	9	0
	6	6	6	3	7	4	8	6	5	1
6.	7	0	0	9	0	7	0	8	3	5
	5	5	3	3	2	3	4	5	7	9
7.	9	9	0	2	8	3	7	6	4	6
	0	9	6	0	3	0	0	5	0	4
8.	7	0	7	3	4	1	8	8	0	5
	7	9	6	9	8	0	9	4	8	0
9.	5	6	0	4	8	6	4	8	1	8
	8	0	7	9	8	7	7	0	1	6
10.	7	9	6	9	9	9	6	8	7	7
	4	8	8	4	7	6	9	7	8	9

MULTIPLYING BY ONE FIGURE

A barrel of potatoes weighs 180 pounds. Find the weight of 4 barrels. We find the weight of 4 barrels of potatoes by multiplying.

$$\begin{array}{r} 180 \\ \times\ 4 \\ \hline 720 \end{array}$$

$4 \times 0 = 0$. Write the 0 under the 4.
$4 \times 8 = 32$. Write the 2 under the 8. Carry the 3.
$4 \times 1 = 4$. 4 and 3 that is carried $= 7$. Write the 7 under the 1.
4 barrels of potatoes weigh 720 pounds.

The sign of multiplication is $\times$. It means *times.*

The number we multiply is the *multiplicand.*

The number we multiply by is the *multiplier.*

The result in multiplication is the *product.*

These words are called the *terms of multiplication.*

Copy, multiply and write the names of the terms:

1. $\begin{array}{r} 112 \\ \times\ 4 \\ \hline \end{array}$	2. $\begin{array}{r} 221 \\ \times\ 7 \\ \hline \end{array}$	3. $\begin{array}{r} 342 \\ \times\ 3 \\ \hline \end{array}$	4. $\begin{array}{r} 153 \\ \times\ 6 \\ \hline \end{array}$	5. $\begin{array}{r} 237 \\ \times\ 5 \\ \hline \end{array}$
6. $\begin{array}{r} 119 \\ \times\ 9 \\ \hline \end{array}$	7. $\begin{array}{r} 164 \\ \times\ 6 \\ \hline \end{array}$	8. $\begin{array}{r} 238 \\ \times\ 5 \\ \hline \end{array}$	9. $\begin{array}{r} 145 \\ \times\ 8 \\ \hline \end{array}$	10. $\begin{array}{r} 236 \\ \times\ 4 \\ \hline \end{array}$
11. $\begin{array}{r} 609 \\ \times\ 8 \\ \hline \end{array}$	12. $\begin{array}{r} 964 \\ \times\ 7 \\ \hline \end{array}$	13. $\begin{array}{r} 879 \\ \times\ 4 \\ \hline \end{array}$	14. $\begin{array}{r} 709 \\ \times\ 3 \\ \hline \end{array}$	15. $\begin{array}{r} 967 \\ \times\ 9 \\ \hline \end{array}$
16. $\begin{array}{r} 887 \\ \times\ 7 \\ \hline \end{array}$	17. $\begin{array}{r} 876 \\ \times\ 80 \\ \hline \end{array}$	18. $\begin{array}{r} 906 \\ \times\ 9 \\ \hline \end{array}$	19. $\begin{array}{r} 579 \\ \times\ 6 \\ \hline \end{array}$	20. $\begin{array}{r} 450 \\ \times\ 9 \\ \hline \end{array}$

MULTIPLYING DOLLARS AND CENTS

A large bag of flour costs $2.15. How much will 4 bags cost? We can find the cost of 4 bags of flour by multiplying.

$$\begin{array}{r} \$2.15 \\ \times\ 4 \\ \hline \$8.60 \end{array}$$

Dollars and cents are multiplied in just the same way that other numbers are multiplied.

When we multiply dollars and cents by a whole number we place the decimal point in the answer so that the same number of figures follow it as follow the decimal point in the multiplicand.

Copy and multiply:

1. $7.14 × 6	2. $7.99 × 4	3. $8.64 × 8	4. $9.37 × 5	5. $7.46 × 9
6. $9.24 × 7	7. $3.36 × 9	8. $10.16 × 3	9. $18.11 × 4	10. $12.09 × 7
11. $18.19 × 8	12. $11.41 × 6	13. $12.14 × 5	14. $9.58 × 4	15. $10.65 × 3

PROBLEMS

The three Martin children are going skating.

1. Their skates cost $3.98 a pair. Find the price of 3 pairs.

2. What did they pay for 3 pairs of long skating gloves at $2.25 a pair?

3. Their warm woolen caps cost $1.97 each. How much did their 3 caps cost?

THE MEASURE OF LENGTH

1. With a foot rule measure the top of your desk. How many inches long is it? How many inches wide?

2. Find the width and the length of your arithmetic book.

3. What is the length and width of your sheet of practice paper or pad?

12 inches (in.) = 1 foot (ft.)

4. Draw on the blackboard a line that you think is 2 feet long. Now measure with the foot rule to see how near right you are.

5. How many inches are there in 2 feet?

6. With your foot rule draw a line on the blackboard 3 feet long. Measure this line with the yard stick. What do you find?

3 feet = 1 yard (yd.)

7. Use the yard stick and draw a line 2 yards long on the blackboard.

8. Without a yard stick draw a line you think is a yard long. Find how many inches too long or too short you have drawn the line.

9. Using the yard stick find the length of the blackboard in feet. In yards.

10. In the school games one of the foot races was 100 yards. 100 yards equal how many feet?

11. Name some things that are bought by the yard.

USING WHAT WE HAVE LEARNED

1. Jennie went with her mother to buy a coat at a bargain sale. She bought a coat for $8.49 that was marked $10.50. How much did she save?

2. Mrs. Thomas gave the clerk a $10.00 bill to pay for Jennie's $8.49 coat. How much change did she receive?

3. A boy scout went on a hike. He took $7.50 with him and spent $1.87 the first day. How much did he have left?

4. The teacher in charge of a playground kept a record of the number of children who came to play. On Monday 205 children came and on Tuesday there were 317. How many more children came on Tuesday than on Monday?

5. James had a small garden from which he sold $8.40 worth of vegetables last summer. His expenses were $1.58. How much did he make?

6. There are 365 days in a year. Harry was in school 179 days during the year. How many days was he not in school?

7. A man built a house that cost $7500 on a lot that cost $925. How much more did the house cost than the lot?

8. It is 298 miles from Albany to Buffalo and 199 miles from Albany to Boston. How much farther is it from Albany to Buffalo than from Albany to Boston?

9. Indian suits sell for $3.95 in one store. In another store they are sold for $3.19. What is the difference in cost?

FACTORS

What numbers multiplied together make 8? $4 \times 2 = 8$. $2 \times 4 = 8$.

As 4 and 2 multiplied together equal 8, we call 4 and 2 the *factors* of 8.

3 and 3 are *factors* of 9 because $3 \times 3 = 9$.

2 and 2 and 3 are *factors* of 12 because $2 \times 2 \times 3 = 12$.

What are the factors of 6, 10, 18, 27?

MULTIPLES

How many times is 2 contained in 8? Is there any remainder? $8 \div 2 = 4$ and no remainder.

As 8 contains 2 an even number of times with no remainder, we call 8 a *multiple* of 2.

9 is a *multiple* of 3 because $9 \div 3 = 3$ with no remainder.

6 is the multiple of two numbers. What are they?

Of what numbers is 24 the multiple?

In each of these examples tell which figures are factors and which are multiples:

$2 \times 3 = 6$	$5 \times 3 = 15$	$2 \times 2 \times 3 = 12$
$3 \times 3 = 9$	$3 \times 7 = 21$	$2 \times 3 \times 5 = 30$
$4 \times 3 = 12$	$5 \times 6 = 30$	$3 \times 5 \times 3 = 45$

What two factors multiplied together will make 8? 12? 36?

Name two factors which multiplied together will equal: 10; 15; 24; 30.

What three factors multiplied together will make 8? 12? 36?

THE TABLE OF ELEVENS

Multiply:

1.	11	11	11	11	11	11
	1	4	5	3	2	6
2.	11	11	11	11	11	11
	8	10	7	11	9	12

Four 11's are ? Five 11's are ? Seven 11's are ?
Eight 11's are ? Eleven 11's are ? Twelve 11's are ?
Two 11's are ? Six 11's are ? Nine 11's are ?
Ten 11's are ? Three 11's are ?

THE TABLE OF ELEVENS

$1 \times 11 = 11$ $7 \times 11 = 77$
$2 \times 11 = 22$ $8 \times 11 = 88$
$3 \times 11 = 33$ $9 \times 11 = 99$
$4 \times 11 = 44$ $10 \times 11 = 110$
$5 \times 11 = 55$ $11 \times 11 = 121$
$6 \times 11 = 66$ $12 \times 11 = 132$

$0 \times 11 = 0$ $11 \times 0 = 0$

REVIEW THESE MANY TIMES

$10 \times 11 = 110$ $11 \times 11 = 121$ $12 \times 11 = 132$

How much must I pay for:

Three 11¢ paint boxes?
Eight 11¢ brushes?
Six 11¢ crayon boxes?
Twelve 11¢ pencils?
Nine 11¢ pads?
Five 11¢ cards?
Seven 11¢ needles?
Two 11¢ tubes of paste?
Ten 11¢ papers of pins?
Four 11¢ bottles of ink?
Eleven 11¢ chalk boxes?

Eleven 12¢ pumpkins?
Eleven 4¢ match boxes?
Eleven 7¢ candles?
Eleven 10¢ notebooks?
Eleven 2¢ candle holders?
Eleven 8¢ masks?
Eleven 5¢ postcards?
Eleven 9¢ Jack o' lanterns?
Eleven 11¢ tarts?
Eleven 3¢ erasers?
Eleven 6¢ apples?

Multiply:

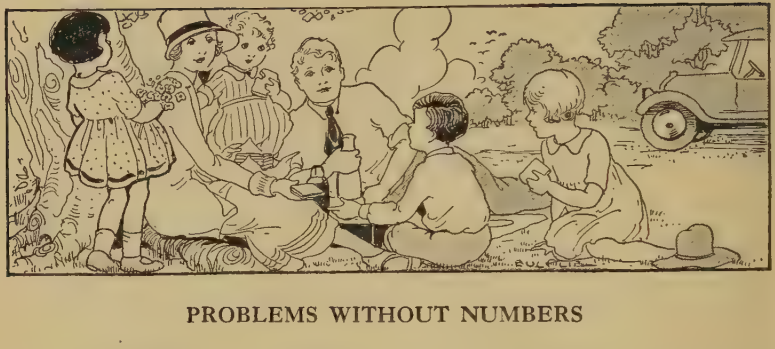
1. 653 × 11	2. 482 × 11	3. 219 × 11	4. 726 × 11	5. 333 × 11
6. 567 × 11	7. 478 × 11	8. 916 × 11	9. 675 × 11	10. 849 × 11

PROBLEMS

1. How much will 11 football suits cost at $8.49 each?

2. Find the cost of 11 sweaters at $3.95 each.

3. How much will 11 pairs of stockings cost at $2.34 a pair?



PROBLEMS WITHOUT NUMBERS

1. The Martin family are on an automobile trip. If you know how many weeks they will be away, how can you tell the number of days they will be gone?

2. If you know how many gallons of gasoline Mr. Martin bought and how much he paid a gallon, how can you tell how much his gasoline cost?

3. If you know how many hours the Martins drove in a morning and the number of miles they drove each hour, how can you find how far they drove in the morning?

4. At lunch each of the family drank a pint of milk. If you know how many there are in the family, how can you tell how many quarts they drank?

5. If you know how many miles the car went in one day, and how far it went in the morning, how can you tell the number of miles it went in the afternoon?

6. The Martins stopped at a stand one afternoon and bought sandwiches. If you know how many of each different kind they bought, how can you tell how many sandwiches they had in all?

THE TABLE OF TWELVES

Multiply:

1.	12	12	12	12	12	12
	1	6	4	8	5	2
2.	12	12	12	12	12	12
	10	11	7	9	3	12

Five 12's are ? Two 12's are ? Twelve 12's are ?
Nine 12's are ? Ten 12's are ? Four 12's are ?
Three 12's are ? Seven 12's are ? Eight 12's are ?
Six 12's are ? Eleven 12's are ?

THE TABLE OF TWELVES

$1 \times 12 = 12$ $7 \times 12 = 84$
$2 \times 12 = 24$ $8 \times 12 = 96$
$3 \times 12 = 36$ $9 \times 12 = 108$
$4 \times 12 = 48$ $10 \times 12 = 120$
$5 \times 12 = 60$ $11 \times 12 = 132$
$6 \times 12 = 72$ $12 \times 12 = 144$

$0 \times 12 = 0$ $12 \times 0 = 0$

REVIEW THESE MANY TIMES

$11 \times 12 = 132$ $12 \times 12 = 144$ $9 \times 12 = 108$
$8 \times 12 = 96$ $7 \times 12 = 84$ $6 \times 12 = 72$

USING DOLLARS AND CENTS

How much must I pay for:

Two 12¢ pineapples?
Six 12¢ boxes of cereal?
Eight 12¢ loaves of bread?
Four 12¢ cans of soup?
Seven 12¢ grapefruit?
Eleven 12¢ melons?
Three 12¢ cocoanuts?
Five 12¢ chocolate bars?
Nine 12¢ bottles of olives?
Twelve 12¢ bars of soap?
Ten 12¢ bottles of soda?

Twelve 3¢ balloons?
Twelve 5¢ drums?
Twelve 8¢ tops?
Twelve 4¢ horns?
Twelve 6¢ marbles?
Twelve 9¢ dolls?
Twelve 12¢ fans?
Twelve 2¢ bells?
Twelve 7¢ whistles?
Twelve 11¢ toy pistols?
Twelve 10¢ flags?

Multiply without copying:

1.	82	35	16	94	73
	12	12	12	12	12
2.	26	34	17	85	29
	12	12	12	12	12

Copy and multiply:

1.	123	2.	654	3.	823	4.	911	5.	740
	12		12		12		12		12
6.	211	7.	402	8.	365	9.	200	10.	543
	12		12		12		12		12

EVERY DAY USES OF THE TABLE OF TWELVES

Many things are bought and sold by the dozen.

12	= 1 dozen (doz.)
12 dozen	= 1 gross (gro.)

1. Name some of the different things your mother buys by the dozen.

2. Pencils for schools are bought by the dozen. How many pencils are there in 8 dozen?

3. Some boys sold lemonade at a stand on the street. One week they bought 7 dozen lemons. How many lemons did they buy?

4. When oranges are selling at 48 cents a dozen, how much will 4 dozen cost?

5. How many eggs are there in 5 dozen?

6. The baker sold 9 dozen rolls. How many did he sell?

7. Grace's mother bought one gross of clothespins. How many clothespins did she buy?

We also use 12's in changing feet to inches.

1. Jack is just 5 feet tall. What is his height in inches?

2. The blackboard is 2 ft. 6 in. wide. What is its width in inches?

Make up problems using the table of twelve.

LIQUID MEASURE

2 pints (pt.)	= 1 quart (qt.)
4 quarts	= 1 gallon (gal.)

Use pint, quart, and gallon measures for measuring water.

1. How many pints make one quart?

2. One pint is what part of 1 quart?

3. When a quart bottle is half filled with water, how much water is there in the bottle?

4. How many quarts of water make a gallon?

5. Name some liquids that your mother buys by the pint. By the quart. By the gallon.

6. If a family uses a quart of milk every day, how much will the milk bill be for 26 days when milk is selling at 16 cents a quart?

7. How much will a quart of cream cost when it is selling at 25 cents a half-pint?

8. How many quarts will a 5-gallon water bottle hold?

9. A boarding house buys 15 gallons of milk each week. How many quarts does it buy?

10. The milk man bottled 20 gallons of milk in pint bottles. How many bottles did he need?

11. If a pint of ice cream will serve 3 girls, how many pints will be needed for 15 girls? How many quarts is this?

MULTIPLYING BY TWO FIGURES

There are 144 pencils in a gross. How many pencils are there in 36 gross?

We can find the number of pencils by multiplying.

144 36 864 partial product 432 partial product 5184 product	$6 \times 144 = 864$. Write the 4 under the 6 by which we have multiplied. $3 \times 144 = 432$. Write the 2 under the 3 by which we have multiplied. Add the partial products to find the product.

There are 5184 pencils in 36 gross.

Remember: We always write the right-hand figure of each partial product under the figure by which we are multiplying.

Copy and multiply:

1. 321 16	2. 496 32	3. 581 45	4. 617 53	5. 276 84
6. 547 29	7. 355 67	8. 264 72	9. 536 19	10. 269 24
11. 148 46	12. 472 31	13. 728 58	14. 611 25	15. 492 38

1. In a city there are 28 troops of Boy Scouts with 32 scouts in each troop. How many scouts are in the city?

2. Harry worked 18 days during vacation and earned $1.75 a day. How much did he earn in all?

PROVING MULTIPLICATION

The easiest way to test your work in multiplication is to multiply again. If both products are the same, it is safe to believe that you have multiplied correctly.

426	426
12	12
852	852
426	426
5112	5112

Copy and multiply. Then test by multiplying again:

1. 436 × 12	2. 205 × 15	3. 441 × 13	4. 316 × 21	5. 442 × 31
6. 560 × 59	7. 417 × 77	8. 582 × 32	9. 470 × 41	10. 623 × 42
11. 643 × 75	12. 478 × 64	13. 742 × 78	14. 319 × 76	15. 280 × 93
16. 151 × 78	17. 381 × 25	18. 272 × 34	19. 554 × 31	20. 889 × 72
21. 192 × 19	22. 336 × 58	23. 403 × 57	24. 690 × 65	25. 132 × 99

Multiply and test your work:

1.	39.75×12	56.19×24	79.06×37
2.	80.27×46	91.83×90	99.87×78

USING WHAT WE HAVE LEARNED

1. At $36 per dozen, how much will 15 dozen silver spoons cost?

2. How many cakes of soap can be packed in 36 boxes if each box will hold 24 cakes?

3. At a church fair 96 boxes of candy were sold at $.75 a box. How much was received for the candy?

4. A farmer sold 72 dozen ears of corn at $.28 a dozen. How much did he receive for all of the corn?

5. A grocer sold a 48 lb. tub of butter at $.52 a pound. How much did the tub of butter bring?

6. A school principal bought 96 readers at 64 cents a copy. How much was the bill for the books?

7. A bushel of potatoes weighs 60 pounds. How many pounds are there in 32 bushels?

8. A fruit grower shipped 78 baskets of peaches to market. They were sold at $.95 a basket. For how much did all sell?

9. A hardware dealer bought 48 pairs of skates for the Christmas trade. He paid $3.65 a pair. What was the amount of the bill?

10. A candy store made 76 pounds of peanut candy and sold it at 27 cents a pound. Find the amount received for the candy.

11. John worked in a grocery store. One day the grocer received 48 pounds of coffee that cost 38 cents a pound. He asked John to find the cost of the coffee. What was the correct answer?

DRY MEASURE

2 pints (pt.)	= 1 quart (qt.)
8 quarts	= 1 peck (pk.)
4 pecks	
or	= 1 bushel (bu.)
32 quarts	

Give the missing numbers:

6 quarts = ? pints	12 qt. = ? pt.
3 pecks = ? quarts	11 pk. = ? qt.
2 bushels = ? pecks	12 bu. = ? pk.
2 bushels = ? quarts	3 bu. = ? qt.

Last summer Tom and his Uncle Frank drove to market once a week.

1. They sold 2 bushels of peas. How many pecks was that?

2. They sold a bushel of apples at 40 cents a peck. For how much did the bushel sell?

3. They sold 36 quarts of strawberries at 16 cents a quart. How much did they get for the berries?

4. They sold 4 bushels of potatoes by the peck. How many pecks did they sell?

5. They sold 4 pecks of beans by the quart. How many quarts did they sell?

6. Tom picked 1 bushel of peas from his garden and sold all of them by the half-peck. How many half pecks did he sell?

AN EASY WAY OF MULTIPLYING

There are 7 days in a week. How many days are there in 52 weeks?

We can find the number of days in 52 weeks by multiplying 7 days by 52. An easier way is to multiply 52 by 7.

	An easier way
7	
52	
14	52
35	7
364 or 364 days	364 or 364 days

The product of 52×7 is the same as the product of 7×52. 7 is a smaller number than 52, so instead of multiplying 7 by 52, we multiply 52 by 7.

There are 364 days in 52 weeks.

Write these so you can multiply in the easier way and multiply:

1.	2.	3.	4.	5.	6.
9	89	8	6	97	7
76	7	78	94	4	57

PROBLEMS

1. Find the cost of 124 three-dollar umbrellas.

2. How many pecks are there in 264 bushels of apples?

3. Fred sold 115 pecks of string beans from his garden. How many quarts did he sell?

4. Rose's mother bought 5 quarts of milk a day for 175 days. How many quarts in all did she buy?

MULTIPLYING BY THREE FIGURES

If an auto bus line can carry 486 passengers a day, how many passengers can be carried in 192 days?

We find out by multiplying.

486	First we multiply by 2.
192	Then we multiply by 9.
972	Then we multiply by 1.
4374	We write the right-hand figure of
486	each partial product under the figure
93312	by which we are multiplying.
	Add the partial products.

93,312 passengers can be carried in 192 days.

Multiply and test:

1. 975 × 212	2. 360 × 154	3. 261 × 241	4. 402 × 315	5. 511 × 168
6. 543 × 269	7. 189 × 232	8. 304 × 194	9. 166 × 243	10. 473 × 198

Copy and multiply:

1. 9432 × 386	2. 7198 × 396	3. 4369 × 835	4. 1926 × 274
5. 5724 × 693	6. 2431 × 728	7. 3286 × 143	8. 8705 × 435
9. 7830 × 299	10. 5864 × 384	11. 7007 × 346	12. 2876 × 672

EVERY DAY USES OF MULTIPLICATION

PLAYING

1. How many boys are needed to make 2 football elevens?

2. A merry-go-round is run 45 times each afternoon. If 20 children ride at a time, how many ride in one afternoon?

3. If a roller coaster car holds 16 people, how many can ride in 8 cars?

WORKING

1. If it takes 3 minutes to do each example, how long will it take to do 20?

2. There are 75 examples on each drill page. How many are there on 11 drill pages?

3. There are 12 questions in each geography lesson. How many are there in 9 lessons?

4. If there are 25 words in each spelling review, how many are there in 12 reviews?

BUYING

Find the cost of:

1. Twelve yards of muslin at 36 cents a yard.

2. Twenty-one bushels of potatoes at 75 cents a bushel.

3. Eighteen dozen eggs at 48 cents a dozen.

4. Forty-eight arithmetics at 72¢ each.

5. Thirty-nine spelling books at 54 cents each.

6. Eighty-four spelling blanks at 15 cents each.

SPEED TEST IN MULTIPLICATION

Copy and multiply. Work as many as you can in five minutes:

1.	40 × 5	36 × 4	51 × 9	13 × 2	85 × 5	58 × 6	90 × 8
2.	24 × 6	84 × 7	60 × 6	77 × 8	96 × 8	29 × 9	68 × 8
3.	10 × 7	87 × 9	97 × 7	74 × 8	22 × 5	76 × 2	90 × 9
4.	78 × 3	94 × 6	76 × 8	10 × 9	69 × 7	28 × 9	20 × 4
5.	17 × 6	67 × 9	36 × 5	27 × 8	79 × 5	34 × 3	49 × 2
6.	15 × 4	39 × 9	87 × 8	28 × 7	80 × 2	65 × 3	90 × 7
7.	19 × 3	97 × 4	20 × 3	35 × 7	84 × 4	55 × 5	36 × 6
8.	47 × 9	25 × 2	86 × 9	18 × 5	51 × 8	93 × 9	30 × 8

ZERO IN THE MULTIPLIER

A barrel of apples weighs 135 pounds. How much will 204 barrels weigh?

We find the weight by multiplying.

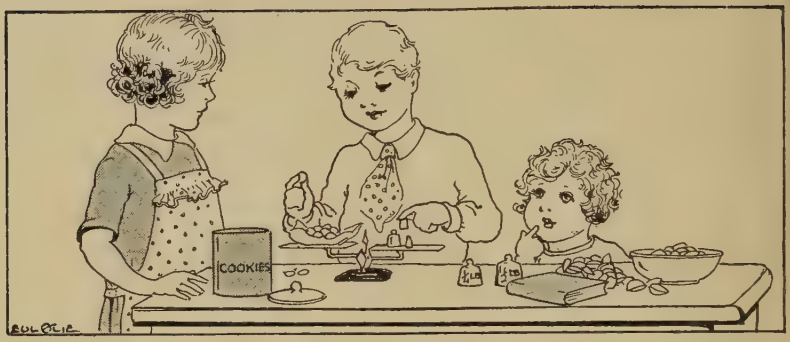
135	$4 \times 135 = 540$. Write 540.
204	$0 \times 135 = 0$. There is no partial prod-
540	uct to write.
270	$2 \times 135 = 270$. **Be sure** to write the 0
27540	under the 2 in the multiplier.
	Add the partial products.

204 barrels of apples weigh 27540 pounds.

Remember: Write the right-hand figure of each partial product under the figure by which you are multiplying.

Copy and multiply:

1.	832 406	2.	798 802	3.	377 607	4.	347 709	5.	473 907
6.	619 804	7.	716 209	8.	345 306	9.	722 407	10.	737 706
11.	529 705	12.	833 407	13.	693 806	14.	724 203	15.	245 408
16.	432 409	17.	705 508	18.	683 609	19.	468 307	20.	719 806
21.	896 709	22.	765 908	23.	879 604	24.	468 406	25.	489 205



THE MEASURE OF WEIGHT

16 ounces (oz.) = 1 pound (lb.)

1. Many things that we buy at the grocery store are measured by weight. Name as many of them as you can.

2. How many ounces are there in a pound? In 2 pounds? In 4 pounds?

3. How much do you think your arithmetic book weighs?

4. Which do you think weighs more, your arithmetic book or your geography? Your arithmetic or your spelling book? If there are scales in your class room, guess the weight of each of your books and then weigh them.

5. Who weighs more, you or the pupil in front of you? If there are scales large enough, weigh and see which is heavier.

Make up problems for your classmates about buying by the pound.

MULTIPLYING BY NUMBERS ENDING IN ZERO

Multiply 44 by 20. Multiply 44 by 300. Multiply 44 by 6000.

44	44	44
20	300	6000
880	13200	264000

When we multiply by any number ending in one or more zeros, we write the multiplier so that the zeros are at the right of the multiplicand. We write 0 in the product under each 0 in the multiplier. Next we multiply by the number in the multiplier at the left of the zeros.

Copy and multiply:

1. 45×20	6. 17×300	11. 316×5000
2. 61×70	7. 67×800	12. 935×4000
3. 89×30	8. 32×500	13. 875×2000
4. 75×50	9. 46×600	14. 631×8000
5. 81×60	10. 58×400	15. 976×6000

Write these numbers in the easier way for multiplying and multiply:

1. 34	2. 98	3. 158	4. 20	5. 47
387	476	58	345	289
6. 78	7. 63	8. 375	9. 60	10. 976
684	908	69	789	69

MEASURES AND THEIR USES

1. Name five things that you buy by the quart.
2. How many pints are there in one quart?
3. Name some things you buy by the peck or bushel.
4. How many quarts are there in one peck?
5. How many pecks are there in one bushel?
6. Name five things you measure with a foot rule.
7. How many inches are there in a foot?
8. Name five things you buy by the yard.
9. How many feet are there in one yard?
10. How many inches are there in one yard?
11. Name five things you buy by the gallon.
12. How many quarts are there in a gallon?
13. How many ounces in a pound?
14. What do you buy by the pound?
15. How many hours in a day?
16. How many seconds in a minute?
17. How many months in a year?
18. Tell all you can about a leap year.

Give the missing numbers:

2 yd. = ? in.	2 da. = ? hr.	2 pk. = ? qt.
3 lb. = ? oz.	3 hr. = ? min.	2 gal. = ? qt.
5 yd. = ? ft.	2 min. = ? sec.	3 bu. = ? pk.

DIVISION

Here are the 90 divisions. The easiest come first. Give the answers as quickly as you can:

$2\overline{)4}$	$5\overline{)25}$	$2\overline{)10}$	$3\overline{)9}$	$5\overline{)30}$	$6\overline{)36}$
$5\overline{)20}$	$9\overline{)81}$	$2\overline{)6}$	$5\overline{)15}$	$2\overline{)12}$	$1\overline{)0}$
$3\overline{)21}$	$5\overline{)10}$	$2\overline{)16}$	$3\overline{)15}$	$2\overline{)14}$	$4\overline{)20}$
$6\overline{)12}$	$2\overline{)8}$	$1\overline{)7}$	$7\overline{)14}$	$7\overline{)21}$	$3\overline{)12}$
$5\overline{)40}$	$1\overline{)1}$	$1\overline{)5}$	$1\overline{)4}$	$3\overline{)0}$	$6\overline{)42}$
$6\overline{)0}$	$1\overline{)6}$	$9\overline{)27}$	$5\overline{)35}$	$4\overline{)0}$	$1\overline{)9}$
$4\overline{)12}$	$8\overline{)0}$	$1\overline{)3}$	$3\overline{)6}$	$5\overline{)45}$	$1\overline{)8}$
$7\overline{)0}$	$8\overline{)72}$	$1\overline{)2}$	$4\overline{)16}$	$8\overline{)32}$	$3\overline{)18}$
$7\overline{)35}$	$8\overline{)16}$	$7\overline{)56}$	$6\overline{)54}$	$4\overline{)32}$	$2\overline{)0}$
$9\overline{)0}$	$5\overline{)5}$	$6\overline{)30}$	$9\overline{)18}$	$4\overline{)4}$	$4\overline{)8}$
$5\overline{)0}$	$6\overline{)24}$	$9\overline{)72}$	$7\overline{)42}$	$3\overline{)24}$	$6\overline{)48}$
$7\overline{)7}$	$9\overline{)45}$	$7\overline{)63}$	$4\overline{)24}$	$6\overline{)18}$	$8\overline{)40}$
$2\overline{)18}$	$9\overline{)54}$	$7\overline{)28}$	$3\overline{)3}$	$6\overline{)6}$	$8\overline{)24}$
$7\overline{)49}$	$3\overline{)27}$	$8\overline{)8}$	$8\overline{)48}$	$9\overline{)36}$	$4\overline{)28}$
$9\overline{)63}$	$2\overline{)2}$	$9\overline{)9}$	$8\overline{)64}$	$8\overline{)56}$	$4\overline{)36}$

SHORT DIVISION

How many quarts are there in 275 pints? We can find out by dividing 275 pints by 2.

2 is contained in 2 once. Write 1 over the 2.
2 is contained in 7, 3 times and 1 remainder. Write 3 over the 7.
2 is contained in 15, 7 times and 1 remainder. Write 7 over the 5.

$$2\overline{)275}$$ 137 and 1 remainder

There are 137 quarts and 1 pint over.

Finding how many times one number is contained in another is *division.*

The number which we divide is the *dividend.*

The number by which we divide is the *divisor.*

The result in division is the *quotient.*

The part of the dividend that is left over at the end of the division is the *remainder.*

Copy and divide:

1. $3\overline{)459}$	2. $5\overline{)472}$	3. $4\overline{)256}$	4. $4\overline{)464}$	5. $6\overline{)984}$
6. $2\overline{)444}$	7. $5\overline{)370}$	8. $8\overline{)260}$	9. $3\overline{)333}$	10. $6\overline{)246}$
11. $4\overline{)728}$	12. $3\overline{)456}$	13. $7\overline{)814}$	14. $3\overline{)219}$	15. $7\overline{)245}$
16. $8\overline{)984}$	17. $4\overline{)764}$	18. $6\overline{)612}$	19. $9\overline{)299}$	20. $7\overline{)283}$
21. $2\overline{)437}$	22. $4\overline{)875}$	23. $5\overline{)508}$	24. $8\overline{)967}$	25. $9\overline{)847}$

ZERO IN THE QUOTIENT

On the playground 412 boys were divided into 4 equal groups. How many were in each group?

We find out by dividing.

	4 is contained in 4, once.
103	4 is contained in 1, 0 times.
$4\overline{)412}$	4 is contained in 12, 3 times.
	There were 103 boys in each group.

Find the quotients:

1. $4\overline{)424}$ $3\overline{)621}$ $5\overline{)1035}$ $6\overline{)1248}$
2. $2\overline{)1101}$ $4\overline{)4802}$ $3\overline{)615}$ $6\overline{)1020}$

PROVING DIVISION

To prove **division,** we multiply the **quotient** by the **divisor** and add the **remainder.** If the answer equals the **dividend,** the division is correct.

		Proof:
quotient	9 and 3 **remainder**	$8 \times 9 = 72$
divisor	$8\overline{)75}$ **dividend**	$72 + 3 = 75$

Copy, divide and prove:

1. $4\overline{)38}$ 2. $8\overline{)57}$ 3. $9\overline{)100}$ 4. $2\overline{)214}$ 5. $3\overline{)29}$
6. $9\overline{)640}$ 7. $7\overline{)670}$ 8. $8\overline{)530}$ 9. $6\overline{)499}$ 10. $9\overline{)415}$
11. $7\overline{)610}$ 12. $9\overline{)524}$ 13. $3\overline{)295}$ 14. $8\overline{)726}$ 15. $6\overline{)572}$

PROBLEMS

1. Bob read the same number of pages in his book each day. In 2 days he read 14 pages. How many pages did he read a day?

2. Twelve peppermint sticks were divided equally among 4 children. How many did each receive?

3. A postman delivered 50 postcards one morning. He delivered 10 in each block. To how many blocks did he deliver mail?

4. Three boys playing ball broke a window. The new pane cost 45 cents. They shared the cost equally. How much did each pay?

5. Alice's father gave her 2 cents each day. How many days would it take her to save 24 cents?

6. If ribbon costs 8¢ a yard, how many yards could you buy for 32¢?

7. Mother made a batch of 50 ginger snaps. She divided them equally among 5 children. How many did each have?

8. Polly paid 40¢ for 2¢ stamps. How many stamps did she buy?

9. Every 3 weeks John's father made a trip to the city. How many trips did he make in 12 weeks?

10. Mary bought 18 cookies. She chose the same number of 3 different kinds. How many were there of each kind?

11. Tom spent 28 cents for 4¢ pencils. How many pencils did he buy?

12. Mary spent 30 cents for 5¢ tarts. How many tarts did she buy?

DIVISION

Give the answers as quickly as you can:

1.	$3\overline{)19}$	$8\overline{)38}$	$4\overline{)34}$	$2\overline{)3}$	$3\overline{)25}$
2.	$7\overline{)59}$	$3\overline{)28}$	$6\overline{)9}$	$7\overline{)45}$	$8\overline{)68}$
3.	$4\overline{)29}$	$5\overline{)46}$	$4\overline{)25}$	$5\overline{)6}$	$6\overline{)25}$
4.	$4\overline{)9}$	$1\overline{)8}$	$3\overline{)17}$	$1\overline{)2}$	$4\overline{)17}$
5.	$7\overline{)9}$	$3\overline{)8}$	$5\overline{)49}$	$8\overline{)46}$	$4\overline{)6}$
6.	$7\overline{)68}$	$6\overline{)49}$	$2\overline{)19}$	$6\overline{)19}$	$7\overline{)50}$
7.	$5\overline{)7}$	$9\overline{)19}$	$8\overline{)49}$	$7\overline{)29}$	$9\overline{)76}$
8.	$4\overline{)37}$	$9\overline{)65}$	$7\overline{)36}$	$3\overline{)41}$	$6\overline{)55}$
9.	$9\overline{)55}$	$6\overline{)32}$	$8\overline{)25}$	$8\overline{)17}$	$8\overline{)10}$
10.	$8\overline{)74}$	$9\overline{)46}$	$9\overline{)11}$	$8\overline{)57}$	$9\overline{)39}$

ONE-HALF

Take a piece of paper. Make believe it is a peanut bar. You wish to give your playmate one-half of it.

1. Fold the paper to show how you will divide the bar. It should look like this:

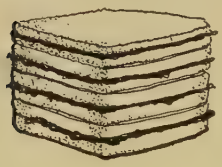
2. Write "$\frac{1}{2}$ of a bar" on each part.

3. Cut the bar into halves. How many halves are there in one bar?

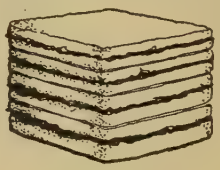
Notice that the two halves are equal in size.

Frank and Will went to a picnic. Their mother made eight sandwiches for them. She divided the sandwiches equally between the two boys in this way:

Frank's sandwiches



Will's sandwiches



1. How many sandwiches did each boy have?

2. What part of the sandwiches did each boy have?

3. How many sandwiches are there in one-half of eight sandwiches? $\frac{1}{2}$ of $8 = ?$

To find $\frac{1}{2}$ of a number we divide the number by 2.

SHARING THINGS

1. John and Tom were brothers. They liked to share things equally with each other. When they divided an orange into 2 equal parts what was each boy's share called?

2. The two boys divided 14 clay marbles. John's share was 7 marbles. Did he have one-half of the 14 marbles?

3. The two boys earned 20 cents doing errands. How much did Tom have, if each earned the same amount?

4. The boys' father bought these fireworks for Tom and John. Tom had $\frac{1}{2}$ of them. What was his share of each?

16 sparklers	12 sky rockets
18 packages of firecrackers	14 pinwheels
10 sticks of punk	8 boxes of torpedoes

Give the missing numbers:

$\frac{1}{2}$ of 10 = ?	$\frac{1}{2}$ of 8 = ?	$\frac{1}{2}$ of 16 = ?
$\frac{1}{2}$ of 4 = ?	$\frac{1}{2}$ of 12 = ?	$\frac{1}{2}$ of 18 = ?
$\frac{1}{2}$ of 2 = ?	$\frac{1}{2}$ of 20 = ?	$\frac{1}{2}$ of 22 = ?
$\frac{1}{2}$ of 6 = ?	$\frac{1}{2}$ of 14 = ?	$\frac{1}{2}$ of 24 = ?

1. How many half yards are there in 1 yard? In 2 yards?

2. Paul's father brought him $\frac{1}{2}$ pound of candy and his mother brought him $\frac{1}{2}$ pound. How many half pounds did he have? How many whole pounds?

3. If you have 1 yard of cloth, how many half yards have you? If you use $\frac{1}{2}$ yard, how many half yards are left?

ONE-THIRD

Ted, Bill and Jack were brothers. Their mother made a small pie for them. She cut it into thirds in this way:

1. Draw a pie. Divide it into thirds. Write on each piece "$\frac{1}{3}$ of a pie."

2. How many thirds are there in one pie?

Notice that the three thirds are equal in size.

Roy, Dan and Jim went fishing. They caught 15 fish. They divided the fish equally among themselves in this way:

Roy's fish

Dan's fish

Jim's fish

1. How many fish did each boy have?

2. What part of all the fish did each boy have?

3. How many fish are there in one-third of fifteen fish?

To find $\frac{1}{3}$ of a number we divide the number by 3.

Give the missing numbers:

1.	$\frac{1}{3}$ of $3 = ?$	$\frac{1}{3}$ of $21 = ?$	$\frac{1}{3}$ of $24 = ?$
2.	$\frac{1}{3}$ of $9 = ?$	$\frac{1}{3}$ of $27 = ?$	$\frac{1}{3}$ of $12 = ?$
3.	$\frac{1}{3}$ of $6 = ?$	$\frac{1}{3}$ of $18 = ?$	$\frac{1}{3}$ of $30 = ?$

USING FRACTIONS IN WORK AND PLAY

1. John had 20 marbles and gave $\frac{1}{2}$ of them to his brother. How many did he have left?

2. Charles misspelled $\frac{1}{4}$ of the 12 spelling words in Monday's lesson. How many words did he misspell?

3. Mr. Williams picked a peck of cherries and gave each of his four children $\frac{1}{4}$ of them. How many quarts of cherries did each of his children have?

4. Mary spent $\frac{1}{2}$ of ten cents for an ice cream cone. How much did the cone cost?

5. Rose has an allowance of 20 cents a week and spends $\frac{1}{4}$ of it for candy. How many cents does she spend for candy each week?

6. Twenty-four children are playing in the park. One-fourth of the children are girls. Find the number of girls.

7. Tom gave one marble to each of his 3 playmates. What part of the 3 marbles did each of Tom's playmates have?

8. Forty children were divided into 2 equal groups. How many were in each group?

9. At 80¢ a pound, what will $\frac{1}{2}$ lb. of candy cost?

10. In a village school there were 164 pupils. One day when it rained $\frac{1}{4}$ of them were absent. How many were absent?

11. How many minutes are there in $\frac{1}{2}$ of an hour?

12. How many minutes are there in $\frac{1}{4}$ of an hour?

DRILLS IN FRACTIONS

How do you find $\frac{1}{2}$ of a number?

Find $\frac{1}{2}$ of each of these numbers:

10, 12, 20, 14, 24, 18, 16, 30, 22

How do you find $\frac{1}{3}$ of a number?

Find $\frac{1}{3}$ of each of these numbers:

6, 12, 9, 15, 21, 18, 24, 30, 27

How do you find $\frac{1}{4}$ of a number?

Find $\frac{1}{4}$ of each of these numbers:

16, 8, 24, 32, 40, 12, 20, 36, 28

What is one of the 5 equal parts of anything called?

To find $\frac{1}{5}$ of a number we divide the number by 5.

$\frac{1}{5}$ of 15 = ? $\frac{1}{5}$ of 20 = ? $\frac{1}{5}$ of 25 = ?

$\frac{1}{5}$ of 30 = ? $\frac{1}{5}$ of 35 = ? $\frac{1}{5}$ of 40 = ?

$\frac{1}{5}$ of 10 = ? $\frac{1}{5}$ of 45 = ? $\frac{1}{5}$ of 50 = ?

How do we find $\frac{1}{6}$ of a number?

Find $\frac{1}{6}$ of each of these numbers:

30, 12, 24, 18, 36, 48, 42, 54, 60

Find $\frac{1}{7}$ of each of these numbers:

14, 21, 35, 42, 28, 56, 49, 70, 63

By what do we divide to find $\frac{1}{8}$ of a number?

$\frac{1}{8}$ of 24 = ? $\frac{1}{8}$ of 16 = ? $\frac{1}{8}$ of 64 = ?

$\frac{1}{8}$ of 40 = ? $\frac{1}{8}$ of 32 = ? $\frac{1}{8}$ of 80 = ?

$\frac{1}{8}$ of 72 = ? $\frac{1}{8}$ of 48 = ? $\frac{1}{8}$ of 56 = ?

USING FRACTIONS IN PROBLEMS

1. Five boys paid 50 cents to rent a boat for an hour. Each boy paid $\frac{1}{5}$ of the cost. How much did each pay?

2. Nell had 56 picture cards. She gave her sister $\frac{1}{8}$ of them. How many did she give to her sister?

3. There are 42 ginger snaps in a package. Ruth ate $\frac{1}{7}$ of a package. How many did she eat?

4. Mary had 24 sheets of writing paper. She used $\frac{1}{6}$ of the paper to write letters. How many sheets did she use?

5. If there are 16 ounces in a pound of butter, how many ounces are there in $\frac{1}{4}$ of a pound?

6. Ruth used 15 yards of lace for ruffles on her dress. She used $\frac{1}{5}$ of the lace for each ruffle. How many yards did she use for each ruffle?

7. The seven boys in Bob's club went to the woods for a picnic. They took 28 sandwiches. Each boy ate $\frac{1}{7}$ of them. How many sandwiches did each boy eat?

8. Barbara saved 96 cents to buy Christmas presents. She spent $\frac{1}{8}$ of the money to buy a toy for the baby. How much did the toy cost?

9. Frank had 48 marbles. One-sixth of them were alleys. How many marbles were alleys?

10. One-fourth of the 64 lights on Ted's Christmas tree were green. How many were green?

11. John weighed 49 pounds. He gained $\frac{1}{7}$ of this weight last summer. How much did he gain?

A TIME TEST IN SHORT DIVISION

Work as many of these examples as you can in 6 minutes:

1. $5\overline{)345}$	2. $3\overline{)294}$	3. $7\overline{)168}$	4. $8\overline{)344}$
5. $9\overline{)668}$	6. $6\overline{)480}$	7. $4\overline{)283}$	8. $2\overline{)182}$
9. $8\overline{)768}$	10. $8\overline{)624}$	11. $8\overline{)336}$	12. $7\overline{)308}$
13. $9\overline{)587}$	14. $4\overline{)376}$	15. $5\overline{)245}$	16. $7\overline{)644}$
17. $2\overline{)207}$	18. $6\overline{)186}$	19. $8\overline{)120}$	20. $3\overline{)309}$
21. $9\overline{)729}$	22. $7\overline{)502}$	23. $4\overline{)652}$	24. $8\overline{)502}$

Copy and find the answers:

1. 77×98	7. $58 + 76$	13. $636 \div 9$
2. $164 - 89$	8. $69 + 66$	14. $243 \div 4$
3. $80 - 48$	9. $624 \div 8$	15. $457 + 8659$
4. $179 + 87$	10. $755 - 369$	16. $1936 - 1870$
5. $388 \div 4$	11. 79×84	17. 980×803
6. 89×76	12. 701×81	18. $517 \div 7$

1. Give the sum of 538 and 554.
2. Give the quotient of 808 divided by 6.
3. Give the product of 458 and 207.
4. Give the difference between 1261 and 378.

PROBLEMS WITHOUT NUMBERS

1. If you know the cost of each of several different articles, how can you find the cost of all?

2. If you know the cost of an ice cream cone, how can you find the cost of cones for a certain number of friends?

3. If you know the cost of a quart of ice cream, how can you find the cost of a pint?

4. If you know the number of minutes it takes you to walk to school each day, how can you find the total number of minutes you spend in walking to school each week?

5. If you know the price of a yard of ribbon, how can you find the cost of one foot of ribbon?

MAKING PROBLEMS

1. Make up a problem about buying three articles at the grocery store.

2. Suppose you have saved some money to buy a Christmas present that costs more money than you have. Make up a problem about it.

3. Make up a problem about the cost of a lunch on the train.

4. Make up a problem about buying a birthday present.

5. Make up a problem about making change at the candy store.

6. Make up a problem in which you use a fraction.

HOW MUCH DO I KNOW?

You should be able to answer these questions by yourself before you begin the second half of the fourth year.

1. When I add, my answer is called the ——.
2. When I subtract, my answer is called the ——.
3. When I multiply, my answer is called the ——.
4. When I divide, my answer is called the ——.
5. Which of these statements is correct?

   The minuend is larger than the subtrahend.

   The minuend is smaller than the subtrahend.

6. When I multiply by a number, where should I write the first figure of the product?
7. Name something that is equal to:

12 inches	3 feet	$\frac{1}{4}$ of a gallon
16 ounces	$\frac{1}{3}$ of a yard	60 minutes
$\frac{1}{4}$ of a bushel	8 quarts	100 cents

8. Which of these statements is true?

   I can prove subtraction by adding the subtrahend and the minuend.

   I can prove subtraction by adding the subtrahend and the difference.

   I can prove subtraction by adding the minuend and the difference.

9. Which of these statements is correct?

   The remainder should be less than the divisor.

   The remainder should be greater than the divisor.

TESTING OUR PROGRESS

This group of tests will help you measure your progress. You should be able to do any one of these tests in ten minutes.

Test I.

1. $\begin{array}{r} 73 \\ 327 \\ 519 \\ 201 \\ 636 \\ \underline{134} \end{array}$

2. $\begin{array}{r} 13443 \\ \underline{-3489} \end{array}$

3. $\begin{array}{r} 94 \\ \underline{\times 64} \end{array}$

4. $4\overline{)3868}$

5. In Lincoln School there are 98 children in the first year, 85 in the second, 76 in the third, 94 in the fourth and 77 in the fifth. How many children are there in the five years of school?

Test II.

1. $\begin{array}{r} 862 \\ 208 \\ 978 \\ 132 \\ 799 \\ \underline{548} \end{array}$

2. $\begin{array}{r} 8651 \\ \underline{\times 80} \end{array}$

3. $\begin{array}{r} 185776 \\ \underline{-86879} \end{array}$

4. $3\overline{)24588}$

5. The Martin family took a long trip last summer. They went 2,169 miles on the train and 3,078 on a ship. Did they go farther on the train or on the ship? How many miles farther?

Test III.

1. $\begin{array}{r} 6879 \\ 231 \\ 4586 \\ 7524 \\ 758 \\ \underline{1256} \end{array}$

2. $2\overline{)38026}$

3. $\begin{array}{r} 113136 \\ \underline{-34577} \end{array}$

4. $\begin{array}{r} 460 \\ \underline{\times 97} \end{array}$

5. Mary picked 16 quarts of blackberries one day last summer and sold them for 25¢ a quart? How much money did she earn?

Test IV.

1. 1409 + 61 + 626 + 1204 + 50 + 419
2. 789×74
3. $6\overline{)50586}$
4. $153105 - 56229$
5. Tom, Jim and Bob have 987 feet of kite string. If they divide it equally, how many feet of string will each boy have?

Test V.

1. 2923 + 40 + 8142 + 60 + 256 + 2979
2. $81241 - 46279$
3. 704×38
4. $7\overline{)55589}$
5. Mother bought a 10 pound turkey that cost 65¢ a pound and 2 quarts of cranberries at 19¢ a quart. How much was her bill?

Test VI.

1. 1356 + 754 + 4078 + 6632 + 34 + 467
2. $9\overline{)688869}$
3. $124215 - 45378$
4. 8731×19
5. Mrs. Brown ordered $\frac{1}{2}$ gallon of ice cream for Tom's party. How many quarts was that?

Test VII.

1. 580 + 526 + 654 + 450 + 771 + 140
2. 1987×806
3. $94236 - 28658$
4. $8\overline{)6289080}$
5. Helen bought $\frac{1}{2}$ lb. of chocolate cookies and $\frac{1}{4}$ lb. of sugar cookies. How many oz. less than a pound did she buy?

FOURTH GRADE

SECOND HALF

SKATING

Bob and Dick have built a skating rink in their yard. Bob has collected 7 pairs of skates to rent.

1. Bob rents his skates at 5¢ for 15 minutes. If a child rents a pair for an hour how much must he pay for them?

2. Fifty children came to skate on Saturday. Thirty-six of these had their own skates. How many had to rent skates?

3. Bob took in 95¢ for renting skates. How many times did he rent skates, if he charged 5¢ each time?

4. Three boys raced to see who could skate around the rink the greatest number of times. Bill went around 75 times, Frank 39 times, Fred 81 times. Find the total number of times all went around the rink.

5. The boys' mother sent out a big platter of hot ginger cookies. There were 72 cookies on the platter. How many dozen was that?

READING AND WRITING ARABIC AND ROMAN NUMBERS

Write and then read 5 numbers each having 6 figures.

Read this number: 999,999. This is the largest number that can be written with 6 figures.

One million is written 1,000,000.

Write in figures:

Five million. Nine million. Three million.
Four million, six hundred sixty-six thousand, one hundred twenty-three.

Find in your geography the names of three cities whose population is greater than a million. Make a list of them and give the population of each.

Find in your geography or a newspaper other uses for five, six or seven figure numbers. Tell how each is used.

These are called Arabic numbers: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

For what do we use Roman numerals to-day?

In writing Roman numerals, how is the value changed:

1. When the letter is repeated? Read: II, XX, CCC.

2. When a letter of less value is placed after a letter of greater value? Read: VI, XI, VIII, XII.

3. When a letter of less value is placed before one of greater value? Read: IV, IX, XIX.

ADDITION DRILL

Give the sums as quickly as you can:

1.	12	30	28	13	35	25	13	44	18	23
	5	8	4	2	6	3	6	8	3	7
2.	14	30	46	17	33	26	16	34	18	19
	3	9	2	3	9	10	4	7	9	4
3.	46	35	27	24	16	35	49	19	27	18
	7	9	6	9	5	7	8	5	4	7
4.	36	27	19	17	47	26	39	18	28	95
	9	5	6	8	9	8	7	5	6	8

SUBTRACTION DRILL

Give the remainders as quickly as you can:

1.	41	37	20	40	12	31	24	19	33	12
	10	4	9	8	8	5	7	2	6	4
2.	18	21	31	11	40	25	16	32	14	23
	5	8	7	9	3	6	8	7	6	7
3.	32	11	42	25	18	34	21	45	13	11
	5	4	3	8	9	8	3	9	5	6
4.	33	26	15	27	47	16	33	34	24	13
	8	7	7	9	8	9	4	9	5	9

ADDITION DRILL

Begin at the bottom and add up. Then test by adding down:

1.	17	47	91	24	75	28	89	97
	74	99	81	30	82	91	93	68
	95	88	74	42	44	90	57	66
	11	23	20	81	36	57	29	97
	58	66	15	64	67	27	19	85
	89	67	99	49	68	19	67	18

2.	78	79	97	67	80	75	50	18
	66	98	99	67	52	35	47	19
	53	85	70	33	22	54	13	38
	35	57	44	86	27	79	67	56
	47	26	66	22	23	87	50	34
	98	79	60	13	78	70	29	57

3.	446	498	668	490	935	49
	443	844	443	223	248	547
	185	692	978	995	205	173
	666	349	133	479	734	43
	296	577	795	520	833	856
	710	415	548	131	296	160

Add and check:

1. 82; 4602; 687; 4201; 1455; 4.
2. 8651; 2108; 4512; 6889; 2601; 2617.
3. 6851; 2340; 33; 1314; 2500; 6587.

A MEASURE GAME

Can you tell what measures are used in selling the articles on this list?

Let two leaders choose sides. Have both teams stand. When the teacher names an article, the player whose turn it is, gives a measure used in selling it. First one side will have a turn and then the other. When the time is up, the side that has the greater number standing, wins.

ribbon	meat	nuts
cookies	peaches	cider
sugar	garden hose	tea
milk	nails	doughnuts
rice	oranges	coffee
potatoes	butter	string
flour	molasses	water
gasoline	cotton cloth	strawberries
oats	eggs	bananas
ice cream	peas	beans
silk	tomatoes	buttons
cheese	candy	apples
rolls	bacon	cup cakes
lemons	lace	velvet
pears	sausage	pencils

SUBTRACTION DRILL

Subtract and prove:

1.	8750	1443	6633	1574	5537
	1703	549	5924	382	2719
2.	1316	4321	2195	85864	9295
	807	3506	1309	44908	7388
3.	1241	3346	10562	9678	6140
	504	665	8577	5317	3929
4.	12811	9537	100214	6072	7817
	4277	2166	97745	1149	384
5.	8782	9280	10029	15406	9309
	6316	6896	3504	9920	6973
6.	8791	13443	9776	11365	2153
	8192	4489	3809	5767	284
7.	1584	94212	15623	81110	14932
	788	56433	5767	48663	7154
8.	10021	7817	9308	10092	10403
	8775	304	6860	3540	4839

Add and check:

1.

$.28	$.80	$.61	$.92	$.44	$.56	$.47	$.78
.72	.84	.36	.28	.44	.90	.64	.67
.88	.24	.29	.16	.76	.22	.97	.66
.39	.21	.31	.90	.60	.16	.99	.90
.83	.10	.55	.66	.54	.86	.79	.85
.28	.65	.84	.27	.79	.59	.47	.28

2.

$ 3.10	$29.35	$ .31	$59.66	$10.00
5.98	35.72	71.18	34.84	90.79
24.80	6.68	10.59	96.09	47.87
27.31	33.77	1.44	22.37	60.86
84.37	66.32	52.71	65.01	53.87
15.53	7.92	47.54	48.48	49.88

Subtract and prove:

1.

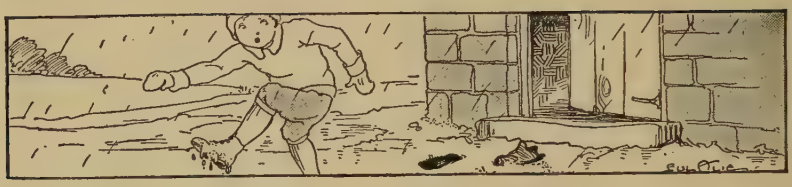
$17.67	$169.34	$44.63	$78.55	$162.34
9.28	94.35	28.39	68.16	76.66

2.

$70.26	$112.85	$78.84	$11.65	$121.36
40.52	33.18	29.58	2.99	55.77

3.

$119.57	$70.09	$176.33	$95.45	$134.43
22.69	16.20	78.94	59.50	48.99



LEARNING TO WORK TWO-STEP PROBLEMS

Charles went to the store and bought 6 cakes of soap at 5 cents a cake. He gave the storekeeper a 50-cent piece. How much change did he receive?

This is called a *two-step* problem because we must find two things to get the answer.

In this problem Charles must find the cost of 6 cakes of soap at 5 cents a cake, and then he must find how much change he will have from his half-dollar.

First Step: Finding the cost of 6 cakes of soap.

Second Step: Finding how much change there will be from 50 cents.

Name the two steps in each problem and then find the answer:

1. Tom had 25 cents. He bought 3 tops at 4 cents each. How much money did he have left? What is the first step? What is the second step?

2. Jennie went to the store with a 50-cent piece. She bought 3 pounds of sugar at 7 cents a pound. How much change did she receive?

3. Mabel bought 4 oranges at 5 cents each and a dozen lemons for 25 cents. How much did she spend?

4. Tom saved 10 cents a day for 6 days and then spent 12 cents for a pad. How much did he have left?

5. Jack bought 6 picture post cards at 5 cents each and had 20 cents left. How much money did he have at first?

6. My daily paper costs 3 cents except on Sunday, when it is 10 cents. How much does my paper cost me for the week?

7. Mother bought 2 dozen oranges and used 6 of them for breakfast. How many oranges were left?

8. At the rate of 2 apples for 5 cents, what is the cost of a dozen?

9. During the week John spent 12 cents a day for 5 days riding on the trolley, and 60 cents for school lunches. How much did he spend in all?

10. Mary's teacher gave 18 sheets of paper to the A class and 17 sheets to the B class. Six of these sheets were not used. How many were used?

11. Charles gave a dollar bill to the clerk to pay for 4 pounds of rice at 10 cents a pound. How much change did he receive?

12. Will had 30 cents and earned 40 cents more. How much more does he need to buy a 98-cent bat?

13. James posted 12 letters after he had put a two-cent stamp on each. He also mailed a parcel post package on which the postage was 14 cents. How much did the stamps cost?

14. Helen bought 2 quarts of milk at 16 cents a quart and a bottle of cream for 23 cents. How much did she spend in all?

15. George bought 2 loaves of bread at 11 cents a loaf and a dozen rolls for 18 cents. How much did he spend?

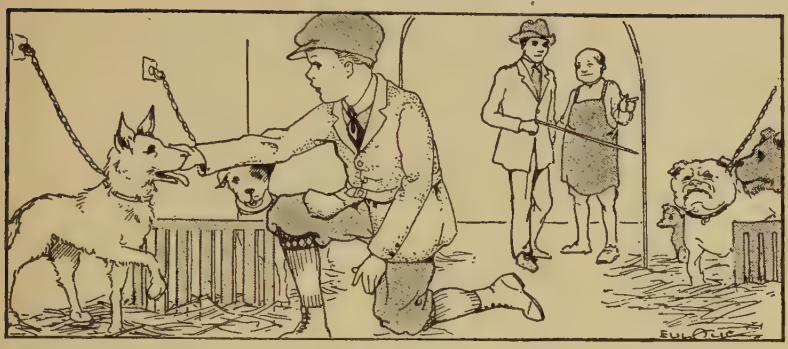
CAT AND MICE

Choose one child to be the cat. The rest of the class stand in line and play they are mice. The cat reads the examples on this page like this, "8 × 1." The first mouse must say "8." The teacher counts to herself, "1, 2, 3, 4," and then says aloud "5." If the first mouse has not given the right answer by the time the teacher says "5!" he is caught and must sit down. If a mouse gives the wrong answer and the cat does not know it, the cat must take his seat and the child who noticed the mistake becomes the cat. The mouse who stands up longest will be the cat next time.

8 × 1;	4;	8;	2;	3;	7;	6;	9;	5;	0
7 × 8;	5;	4;	9;	0;	2;	3;	6;	7;	1
9 × 7;	4;	2;	8;	3;	0;	5;	1;	6;	9
6 × 3;	6;	5;	8;	7;	4;	9;	2;	0;	1
4 × 9;	7;	3;	1;	6;	4;	0;	5;	2;	8
2 × 3;	6;	5;	8;	7;	4;	9;	2;	0;	1
5 × 5;	0;	9;	1;	8;	2;	7;	3;	6;	4
3 × 4;	8;	2;	6;	3;	5;	7;	9;	0;	1

Copy and multiply:

1.	70 98	2.	51 80	3.	40 97	4.	56 78	5.	89 84	6.	98 67
7.	67 48	8.	70 42	9.	110 81	10.	90 53	11.	87 95	12.	708 6
13.	806 5	14.	387 103	15.	687 80	16.	380 9	17.	873 7	18.	504 8
19.	406 7	20.	879 6	21.	897 4	22.	529 908	23.	498 7	24.	646 109



1. Tom saved money to buy a dog. He earned $18.68 last summer, his grandmother gave him $5.80 and his father gave him $3.25. How much did he have then?

2. Father and Tom went to see some dogs at a kennel. They saw a police dog puppy for $35.00 and a Scotch terrier that cost $31.25. What was the difference in the cost of the two dogs?

3. Tom liked an Airedale puppy that cost $28.50, but his father said $25.00 was enough to pay for a dog. How much more than $25.00 would the Airedale cost?

4. Finally Tom bought a bull dog for $24.75. He bought a collar for him that cost $2.19 and some dog biscuit for 48 cents. How much did he spend in all?

5. Tom bought his dog's collar at a sale. The sale price of $2.19 was 51 cents less than the regular price. What was the regular price?

6. Tom wished he could buy all of the dogs. How much would it cost to buy a police dog for $35.00, a Scotch terrier for $31.25, an Airedale for $28.50 and a bull dog for $24.75?

MULTIPLICATION DRILL

Copy and multiply:

1.	51	52	75	43	81	20	98	19
	75	92	51	51	92	43	51	10
2.	26	12	39	51	20	42	65	32
	21	78	32	96	65	40	63	70
3.	30	34	65	73	49	78	86	14
	84	36	84	70	90	43	75	70
4.	70	83	61	79	85	99	67	89
	67	49	90	68	80	74	89	86

5.	6807	7086	7869	9015	9043	814
	35	704	63	82	97	808
6.	6035	1429	7809	1708	9674	1709
	809	340	86	197	708	302

Multiply:

1. **778** by 87; by 98; by 64; by 70; by 53.
2. **969** by 67; by 96; by 48; by 50; by 21.
3. **401** by 97; by 10; by 68; by 59; by 42.
4. **235** by 80; by 97; by 78; by 807; by 609.

Copy and multiply:

1. 4076 × 1900	2. 8579 × 800	3. 7098 × 473	4. 7806 × 35	5. 3054 × 298
6. 9281 × 910	7. 5098 × 804	8. 5439 × 706	9. 6807 × 768	10. 3467 × 409

MULTIPLICATION TEST

1. 46 × 7	70 × 6	89 × 8	68 × 4	98 × 7	79 × 4	67 × 8	89 × 6	67 × 9
2. 84 × 89	86 × 35	35 × 98	19 × 39	73 × 37	68 × 20	37 × 25	49 × 15	43 × 46
3. 201 × 18	568 × 70	250 × 87	702 × 49	154 × 34	406 × 62	215 × 56		
4. 8112 × 730	4867 × 900	9685 × 12	8409 × 305	2317 × 201	9765 × 908			

Copy, find the answers and check:

1. $13443 - 3489$. $15776 - 6879$. $13136 - 4577$
   $18415 - 8729$.
2. $7786 + 6337 + 985 + 6538$.
   $692 + 9597 + 89 + 7456$.
3. $6676 + 3632 + 4542 + 5781$.
   $6368 + 39 + 306 + 1874$.
4. 9×469. 70×568. 98×906. 8999×674.
   1451×1708.
5. $12125 - 4328$. $16234 - 7666$. $1705 - 926$.
   $1118 - 905$.

TESTING YOURSELF IN SHORT DIVISION

Here are 100 examples in short division. Give the quotients and the remainders. Mark yourself by taking one credit off for each mistake.

1.	$2\overline{)5}$	$4\overline{)36}$	$5\overline{)28}$	$8\overline{)56}$	$2\overline{)11}$	$8\overline{)64}$
2.	$3\overline{)11}$	$9\overline{)9}$	$5\overline{)34}$	$2\overline{)2}$	$6\overline{)41}$	$4\overline{)28}$
3.	$5\overline{)23}$	$9\overline{)36}$	$9\overline{)89}$	$8\overline{)48}$	$2\overline{)7}$	$8\overline{)8}$
4.	$5\overline{)19}$	$3\overline{)27}$	$2\overline{)13}$	$7\overline{)49}$	$1\overline{)0}$	$8\overline{)24}$
5.	$3\overline{)23}$	$6\overline{)6}$	$5\overline{)13}$	$3\overline{)3}$	$2\overline{)17}$	$7\overline{)28}$
6.	$3\overline{)17}$	$9\overline{)54}$	$2\overline{)15}$	$2\overline{)18}$	$4\overline{)23}$	$8\overline{)40}$
7.	$6\overline{)16}$	$6\overline{)18}$	$2\overline{)9}$	$7\overline{)63}$	$1\overline{)7}$	$9\overline{)45}$
8.	$7\overline{)19}$	$6\overline{)48}$	$7\overline{)7}$	$3\overline{)14}$	$7\overline{)26}$	$3\overline{)24}$
9.	$5\overline{)43}$	$7\overline{)42}$	$1\overline{)1}$	$9\overline{)72}$	$1\overline{)5}$	$6\overline{)29}$
10.	$1\overline{)4}$	$3\overline{)0}$	$4\overline{)8}$	$6\overline{)47}$	$5\overline{)0}$	$4\overline{)4}$
11.	$6\overline{)0}$	$9\overline{)18}$	$6\overline{)30}$	$5\overline{)39}$	$9\overline{)35}$	$1\overline{)6}$
12.	$5\overline{)5}$	$4\overline{)0}$	$1\overline{)9}$	$9\overline{)0}$	$4\overline{)15}$	$2\overline{)0}$
13.	$8\overline{)0}$	$4\overline{)32}$	$1\overline{)3}$	$6\overline{)54}$	$3\overline{)6}$	$7\overline{)56}$
14.	$4\overline{)39}$	$5\overline{)48}$	$8\overline{)63}$	$1\overline{)8}$	$8\overline{)71}$	$7\overline{)0}$
15.	$9\overline{)17}$	$8\overline{)79}$	$9\overline{)70}$	$9\overline{)44}$	$1\overline{)2}$	$4\overline{)19}$
16.	$4\overline{)31}$	$8\overline{)39}$	$8\overline{)55}$	$3\overline{)20}$	$8\overline{)15}$	$7\overline{)41}$
17.	$8\overline{)23}$	$2\overline{)3}$	$4\overline{)24}$	$9\overline{)63}$		

USING WHAT WE HAVE LEARNED

1. Peggy lives on a farm and raises hens. One of her hens has 27 little yellow chicks. Another hen has 19 black chicks, another hen has 9 white chicks and 7 yellow chicks. How many chicks has Peggy in all?

2. Peggy gathers the eggs and sells them. One week she gathered 204 eggs. How many dozen did she have?

3. One day Peggy sold 5 dozen eggs at 42¢ a dozen. With the money she bought a sweater for $1.98. How much money did she have left?

4. Peggy's brother Bill wanted a bicycle that cost $22.79. He worked in a store for 18 days at $1.35 a day. How much money did he have left from his earnings after buying the bicycle?

5. Bill's father has a dairy. One day he sold 208 quarts of milk at 10¢ a quart. How much was he paid for the milk?

Find the answers:

1. $7989 + 2657 + 6675 + 9388$. $89 + 665 + 96 + 737$.
2. $8334 - 6869$. $4467 - 3888$. $14182 - 7385$.
3. 48×8067. 69×8476. 76×6489.
4. $549 \div 9$. $637 \div 9$. $1902 \div 7$.

1. What is the quotient of 5664 divided by 9?
2. What is the sum of 7776 and 3589?
3. What is the product of 897 and 806?
4. What is the difference between 13365 and 5767?

FINDING AVERAGES

Mary's spelling mark was 95 on Monday, 100 on Tuesday, 90 on Wednesday, 95 on Thursday, and 100 on Friday. What was her daily average mark for the five days?

To find her daily average mark we add Mary's spelling marks. The sum is 480.

Then we divide 480 by 5, because she had spelling on five days. The quotient is 96.

Mary's average mark for the five days was 96.

```
 95
100                      96 Mary's average mark.
 90                 5)480
 95
100
---
480 Sum of Mary's marks for 5 days.
```

EVERY DAY PROBLEMS ABOUT AVERAGES

1. Tom's arithmetic mark was 90 on Monday, 80 on Tuesday, 85 on Wednesday, 75 on Thursday and 100 on Friday. Find his daily average mark for the five days.

2. Tom's height is 51 inches, Ned's 53, and Roger's 49. Find the average height of the three boys.

3. On Wednesday the temperature out of doors was 78°, on Thursday 85°, on Friday 81° and on Saturday 88°. Find the average temperature for the four days.

4. Bob delivers groceries on his bicycle after school. One week he earned $2.95, the next $3.14 and the next $1.80. What were his average weekly earnings?

5. The first week Bob saved $1.85, the next $2.50 and the third week 75 cents. What were his average weekly savings?

6. Four boys had a picnic. They spent 25 cents for bacon, and 55 cents for eggs. They shared the expense equally. How much did each boy pay?

7. There are nine girls in one class. Here are their ages. Mary is 8. Rose is 9. Clara is 9. Ruth is 10. Nancy is 8. Julia is 9. Katharine is 9. Flora is 8. Nell is 11. Find the average age of the girls.

8. Alice's mother wanted her to sleep 9 hours every night. On Monday night she slept 9 hours; on Tuesday night, 10 hours; on Wednesday, 8 hours; on Thursday, 10 hours; on Friday night, 7 hours and on Saturday night, 12 hours. Was her average more or less than 9 hours?

9. If the weight of all the men on a football team is 1815 pounds, what is the average weight of the 11 players?

10. Sally spent 84 cents for lunches during four days. What was the average cost a day?

11. On Monday 38 children were present in the fourth grade; on Tuesday, 39; on Wednesday, 40; on Thursday, 38; on Friday, 40. What was the daily average attendance?

12. A train ran 40 miles the first hour and 50 miles the second hour. What was the average for 1 hour?

LONG DIVISION

A fourth grade class received 294 packages of seeds. The teacher wishes to divide these equally among 21 boys. How many packages of seeds should each boy receive? We find out by dividing.

```
  14
21)294
  21
  84
  84
```

21 is not contained in the first figure of the dividend, but it is contained in the first two figures. 21 is contained in 29 about as many times as 2 is contained in 2, or 1 time.

Write the 1 over the 9.

Multiply 21 by 1. Write 21 under 29.

Subtract 21 from 29. Write 8.

Bring down the 4 of the 294. Place it after the remainder, 8.

84 is the new dividend. 21 is contained in 84 about as many times as 2 is contained in 8, or 4 times. Write 4 over the 4.

Multiply 21 by 4.

Write 84 under 84 and subtract.

There is no remainder.

Each boy will receive 14 packages of seeds.

Remember: Each number to be subtracted must be less than the number from which it is to be taken.

Give the quotients at sight:

1.	$21\overline{)42}$	2.	$31\overline{)93}$	3.	$31\overline{)62}$	4.	$22\overline{)22}$	5.	$42\overline{)84}$
6.	$20\overline{)80}$	7.	$42\overline{)42}$	8.	$21\overline{)63}$	9.	$30\overline{)90}$	10.	$22\overline{)88}$
11.	$32\overline{)96}$	12.	$21\overline{)84}$	13.	$41\overline{)41}$	14.	$22\overline{)66}$	15.	$32\overline{)64}$

DIVISION WITH A REMAINDER

A packer had 653 cans to pack in 21 boxes of the same size. How many cans did he pack in each box? We find out by dividing.

$$\begin{array}{r} 31 \\ 21\overline{)653} \\ \underline{63} \\ 23 \\ \underline{21} \\ 2 \text{ remainder} \end{array}$$

21 is contained in 65 about as many times as 2 is contained in 6, or 3 times.

Write 3 over 5. $3 \times 21 = 63$.

Subtract 63 from 65. Bring down 3.

23 is the new dividend.

21 is contained in 23 once. Write 1 over 3.

$1 \times 21 = 21$. Subtract 21 from 23. The remainder is 2.

The packer put 31 cans in each box and had 2 cans left over.

Remember: Each remainder must be less than the divisor.

Copy and divide:

1. $21\overline{)255}$	2. $21\overline{)865}$	3. $22\overline{)685}$	4. $22\overline{)758}$
5. $31\overline{)998}$	6. $32\overline{)675}$	7. $31\overline{)964}$	8. $41\overline{)904}$
9. $32\overline{)994}$	10. $41\overline{)870}$	11. $42\overline{)885}$	12. $51\overline{)564}$
13. $62\overline{)685}$	14. $22\overline{)529}$	15. $41\overline{)495}$	16. $31\overline{)715}$
17. $21\overline{)485}$	18. $21\overline{)495}$	19. $41\overline{)909}$	20. $32\overline{)673}$
21. $51\overline{)569}$	22. $31\overline{)670}$	23. $22\overline{)905}$	24. $42\overline{)899}$

LONG DIVISION

A library contains 13797 books. If there is an average of 21 books on each shelf, find the number of shelves there are in the library. We find the number by dividing.

```
      657
21)13797
   126
   119
   105
   147
   147
```

21 is not contained in 13, but it is contained in 137 about as many times as 2 is contained in 13, or 6 times.
$6 \times 21 = 126$.

Subtract 126 from 137 and bring down the next figure of the dividend. 119 is the new dividend.

2 is contained in 11 five times.
$5 \times 21 = 105$.

Subtract 105 from 119 and bring down the next figure. 147 is the new dividend.

2 is contained in 14 seven times.
$7 \times 21 = 147$.

Subtract 147 from 147. There is no remainder.

There are 657 shelves in the library.

Copy and divide:

1. $31\overline{)13554}$	2. $21\overline{)1785}$	3. $32\overline{)10974}$	4. $41\overline{)15088}$
5. $51\overline{)14484}$	6. $61\overline{)17934}$	7. $71\overline{)15833}$	8. $81\overline{)18468}$
9. $42\overline{)11398}$	10. $31\overline{)26877}$	11. $22\overline{)15876}$	12. $91\overline{)168077}$
13. $21\overline{)11886}$	14. $52\overline{)32946}$	15. $61\overline{)19582}$	16. $32\overline{)14787}$

GOING TO MARKET

1. John has 95 eggs in his basket. About how many dozen is that? 96 eggs is 8 dozen, so 95 eggs is about 8 dozen.

2. If eggs are selling for 39 cents a dozen, about how much can John sell 5 dozen eggs for? Explain how you found your answer.

3. John has 25 pecks of potatoes on his load. About how many bushels is that?

4. John is going to bring home 100 bulbs. If he sets them out with 11 in a row, about how many rows can he make?

5. John's sister sent for 19 yards of ribbon. About how much will it cost at 12¢ a yard?

6. John's mother asked him to buy 5 boxes of pansy plants. If they cost 49¢ a box, about how much will he pay for them?

7. At 21¢ each, about how much will John have to pay for 15 fish lines?

Copy and divide:

1. $41\overline{)861}$	2. $20\overline{)640}$	3. $30\overline{)690}$	4. $21\overline{)462}$	5. $22\overline{)462}$
6. $21\overline{)441}$	7. $31\overline{)651}$	8. $41\overline{)533}$	9. $21\overline{)651}$	10. $31\overline{)868}$
11. $21\overline{)252}$	12. $41\overline{)492}$	13. $32\overline{)992}$	14. $51\overline{)561}$	15. $31\overline{)744}$
16. $42\overline{)924}$	17. $21\overline{)294}$	18. $31\overline{)713}$	19. $22\overline{)528}$	20. $32\overline{)416}$
21. $61\overline{)671}$	22. $31\overline{)682}$	23. $21\overline{)483}$	24. $32\overline{)736}$	25. $62\overline{)682}$
26. $31\overline{)992}$	27. $22\overline{)682}$	28. $52\overline{)572}$	29. $21\overline{)672}$	30. $31\overline{)775}$
31. $42\overline{)546}$	32. $31\overline{)961}$	33. $41\overline{)902}$	34. $52\overline{)780}$	35. $21\overline{)882}$
36. $31\overline{)899}$	37. $52\overline{)936}$	38. $42\overline{)714}$	39. $21\overline{)399}$	40. $41\overline{)779}$

41. $21\overline{)13774}$ 42. $51\overline{)16627}$ 43. $41\overline{)27338}$ 44. $32\overline{)26798}$

PROBLEMS

1. A kindergarten teacher divided 726 colored beads equally among 22 children. How many beads did each child receive?

2. Mrs. Brown drove 192 miles using 12 gallons of gas. How many miles did she average a gallon?

3. Last summer Tom spent 264 hours in a cottage at the seashore. How many days was that?

4. A toy dealer ordered a supply of 462 games for the Christmas trade. He ordered 42 kinds. How many did he have of each kind, if he ordered the same number of each kind?

5. In Mary's reader there are 384 pages. If she reads 12 pages a day how many days would it take her to read through the book?

RAISING MONEY FOR SCHOOL PICTURES

The pupils of the Jackson school had great fun raising money to buy some pictures for the school. These problems tell how the money was raised:

1. The children gave a play for which they charged an admission of 35 cents. There were 500 tickets sold. Find how much money was received for tickets.

2. The children made fancy articles to sell at the school booth. They sold 120 dressed dolls at 49 cents each. For how much did they sell all of the dolls?

3. At the ice cream stand 300 dishes of cream were sold at 15 cents a dish. How much was taken in?

4. Home made candy was sold in fancy boxes at 29 cents a box. The pupils sold 75 boxes. How much money did they take in?

5. The children in the fourth grade brought 200 things for a bargain counter. There were 40 children in the class and each child brought the same number. How many articles did each child bring?

6. Five hundred people arrived at the play in 20 minutes. How many people arrived on an average each minute?

7. There was a Punch and Judy show. 136 people paid 5¢ each to see it. How much was received from the show?

8. The school made $270 in all. The money was spent for pictures at $15 each. How many pictures did they buy?

Make up some other problems about raising money to help make a school attractive.

THE PROOF IN DIVISION

A bushel of oats weighs 32 pounds. How many bushels are there in a truck load of oats weighing 13,798 pounds? How many pounds are left over?

We find out by dividing.

Division:			Proof:
	431	**quotient**	
divisor	32)13798	**dividend**	431
	128		32
	99		862
	96		1293
	38		13792
	32		6
	6	**remainder**	13798

We prove an example in division by multiplying the *quotient* by the *divisor* and adding the *remainder* if there is one. If the answer equals the *dividend,* the division is correct.

Divide and prove:

1. $21\overline{)4494}$
2. $32\overline{)1184}$
3. $22\overline{)4676}$
4. $41\overline{)35613}$
5. $31\overline{)23405}$
6. $42\overline{)88931}$
7. $51\overline{)17642}$
8. $52\overline{)25034}$
9. $61\overline{)40020}$
10. $32\overline{)45573}$
11. $42\overline{)55942}$
12. $71\overline{)27496}$

PROBLEMS WITHOUT NUMBERS

1. If you know the amount spent for a number of oranges, how can you find the cost of one?

2. If you know the cost of one book, how can you find the cost of a given number of books?

3. If you know the distance a man traveled in his automobile and the number of hours he drove, how can you find the average speed per hour?

4. If you know how far a car has been driven and the number of gallons of gasoline that have been used, how do you find the number of miles the car averaged on a gallon of gasoline?

5. If you know the number of lemons there are in a crate, how can you find the number of dozen in it?

6. If you know the cost of a school picnic and the number of children who were there, how do you find the amount each pupil had to pay if the cost is the same for each pupil?

7. If you know how much it costs to ride on the trolley, how do you find the cost of a given number of rides?

8. What two things should you have to know to find the cost of a roast of beef?

9. If you know in what year a man was born and in what year he died, how can you tell how long he lived?

10. If you know the cost of the ice cream, the cake and the candies for a party, and the number of people who shared equally the cost of the party, how can you tell how much each had to pay?

FINDING THE CORRECT QUOTIENT FIGURE

Mary has 285 pieces of candy to pack. Each box holds 32 pieces. How many boxes can she fill? We find out by dividing.

$$\begin{array}{r} 8 \\ 32\overline{)285} \\ \underline{256} \\ 29 \end{array}$$

As 3 is contained in 28 nine times, we may try 9 as the quotient figure, but $9 \times 32 = 288$. This is more than the 285 from which we are to subtract.

Then we try 8. $8 \times 32 = 256$.

$285 - 256 = 29$. 29 is less than the divisor, so we know 8 is right.

Mary can fill 8 boxes and have 29 pieces left.

1. $21\overline{)165}$ 2. $22\overline{)185}$ 3. $61\overline{)121}$
4. $32\overline{)247}$ 5. $31\overline{)153}$ 6. $52\overline{)255}$

Polly knit 2945 stitches yesterday. How many rows of 79 stitches each did she knit? We find out by dividing.

$$\begin{array}{r} 37 \\ 79\overline{)2945} \\ \underline{237} \\ 575 \\ \underline{553} \\ 22 \end{array}$$

As 79 is only a little less than 80, we divide by 8 in place of 7 to find the figures of our quotient.

$29 \div 8 = 3$. Write 3 over 4.

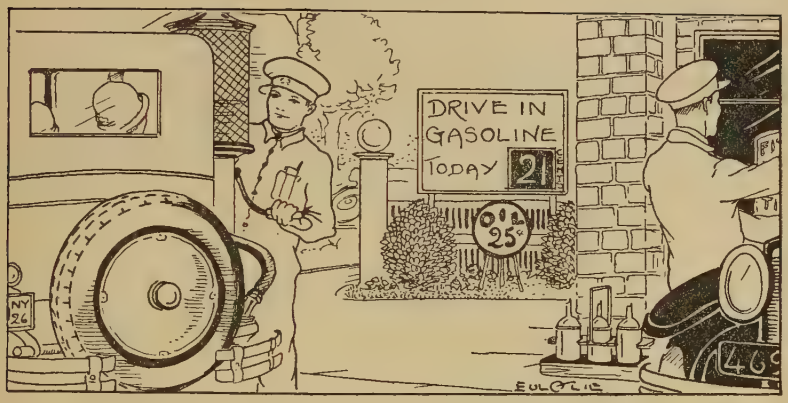
$3 \times 79 = 237$. $294 - 237 = 57$. Bring down 5.

$57 \div 8 = 7$. Write 7 over 5.

$7 \times 79 = 553$. $575 - 553 = 22$ remainder.

Polly knit 37 rows and 22 stitches over.

If your divisor is in the thirties and is 35 or more, think of it as 40 and divide by 4 instead of 3. If your divisor is in the forties and is 45 or more, think of it as 50.



SELLING GASOLINE AND OIL

Here is the record of seven sales of gasoline and oil made in one hour at a gasoline station.

Sale	Oil	Gasoline
1.	1 qt.	8 gal.
2.	2 qt.	7 gal.
3.	3 qt.	5 gal.
4.	2 qt.	10 gal.
5.	1 qt.	12 gal.
6.	2 qt.	15 gal.
7.	2 qt.	8 gal.

1. How many quarts of oil were sold during the hour?

2. How many gallons of gasoline were sold during the hour?

3. Find the amount of each of the 7 sales. How much money did the gasoline station receive in the hour?

4. The dealer made 2 cents a gallon on all the gasoline he sold, and 5¢ a quart on the oil. Did he make more on the sales of gasoline or oil? How much more?

5. Ask someone who drives an automobile the price of gasoline and oil in your town and make up some problems for your class to work.

PROBLEM STUDY

Before we work a problem, it is helpful to decide about what the answer should be. This often prevents foolish mistakes.

1. Mother bought 4 pounds of Christmas candy at 28 cents a pound. About how much did the candy cost?

2. Berries are selling at 23 cents a quart. About how much would 8 quarts cost?

3. Ties are selling at 98 cents each. About how much will half a dozen cost?

4. A man taking a long auto trip is averaging about 28 miles an hour. About how many hours will it take him to drive 150 miles at this rate?

5. When oranges are selling at 62 cents a dozen, about how much would 3 cost?

6. About how much will 5 yards of ribbon cost at 21 cents a yard?

7. About how much money should you take to the store to buy a 15-cent present for each of 19 children?

8. When candy is selling at 49 cents a pound, about how much should you pay for 5 pounds?

9. About how many days are there in half a year?

10. About how many 9-cent toys could a boy buy for $1.00?

11. About how much would it cost for 30 classroom desks at $6.95 each?

12. At 19 cents a dozen, about how many dozen ears of sweet corn could you buy for a dollar?

ZERO IN THE QUOTIENT

Farmer Brown has 21 bags of grain that together weigh 2268 pounds. What is the average weight of the bags? We find out by dividing.

```
  108
21)2268
   21
   ---
   168
   168
   ---
```

21 is contained in 22 once. $1 \times 21 = 21$.
$22 - 21 = 1$. Bring down 6.
Because 21 cannot be contained in the new dividend, 16, write 0 in the quotient and bring down the 8.
21 is contained in 168 eight times.
The average weight of the bags is 108 pounds.

Remember: After we place the first figure in the quotient, there must be a figure in the quotient over each dividend figure we bring down to make a new dividend.

Copy and divide:

1. $21\overline{)4305}$ 2. $21\overline{)6321}$ 3. $31\overline{)6479}$ 4. $22\overline{)2210}$

5. $52\overline{)10608}$ 6. $61\overline{)24522}$ 7. $71\overline{)28897}$ 8. $91\overline{)55292}$

Forty-two elephants in a circus ate 6720 pounds of hay one day. How many pounds did each average? We find out by dividing.

```
  160
42)6720
   42
   ---
   252
   252
   ---
     0
```

42 is contained in 67 once.
42 is contained in 252 six times, and no remainder.
Bring down the 0 of 6720.
42 is contained in 0, zero times.
Write 0 in the quotient.
Each elephant averaged 160 pounds.

DIVIDING DOLLARS AND CENTS

1. The expenses of 5 boys on a hiking trip amounted to $12.25. What was each boy's share?

2. A camping outfit for 21 boys cost $29.40. What was each boy's share?

Dollars and cents are divided in just the same way that we divide other numbers. Be sure to put a decimal point in the quotient over the decimal point in the dividend.

1. $5)\overline{\$12.25}$ — $\$2.45$

2. $21)\overline{\$29.40}$ — $\$1.40$

$$\begin{array}{r} 21 \\ \hline 84 \\ 84 \\ \hline 0 \end{array}$$

Copy and divide:

1. $4)\overline{\$14.24}$	2. $14)\overline{\$14.28}$	3. $12)\overline{\$15.60}$
4. $5)\overline{\$25.50}$	5. $11)\overline{\$13.20}$	6. $16)\overline{\$42.40}$
7. $5)\overline{\$44.40}$	8. $10)\overline{\$75.50}$	9. $15)\overline{\$22.50}$
10. $8)\overline{\$96.08}$	11. $18)\overline{\$86.40}$	12. $25)\overline{\$16.75}$
13. $1568 \div 28$	14. $14592 \div 48$	15. $30018 \div 31$
16. $2498 \div 39$	17. $21440 \div 67$	18. $12301 \div 62$
19. $2793 \div 49$	20. $35250 \div 75$	21. $15709 \div 79$
22. $1836 \div 27$	23. $50960 \div 56$	24. $57216 \div 29$
25. $1653 \div 29$	26. $35880 \div 52$	27. $19823 \div 43$

HOW MUCH DO I KNOW ABOUT LONG DIVISION?

1. In this example, which is the dividend? The divisor? The quotient?

$$\begin{array}{r} 34 \\ 22\overline{)748} \\ \underline{66} \\ 88 \\ \underline{88} \end{array}$$

2. How did we find out that the first figure in the quotient should be 3?

3. Why do we place the 3 over the 4?

4. How many steps did we use in working this long division example? Name them?

5. How did we find the first 88 in this example?

6. How can we prove that this quotient is right? How do we prove the answer when there is a remainder?

7. How do we find the first figure in the quotient when the divisor is not contained in the first figure of the dividend?

8. After we have our first figure placed in the quotient, how do we know how many figures there must be in the quotient?

9. When do we write 0 in the quotient?

10. Here are some unfinished examples with mistakes in them. See if you can tell what is wrong.

$$\begin{array}{r} 2 \\ 42\overline{)714} \end{array} \qquad \begin{array}{r} 1 \\ 42\overline{)856} \\ \underline{42} \\ 436 \end{array} \qquad \begin{array}{r} 23 \\ 42\overline{)8565} \\ \underline{84} \\ 165 \end{array}$$

Each of these examples has some difficulty. Work them and tell where the difficulties are:

$13440 \div 32$ $\qquad$ $1235 \div 65$

$8546 \div 42$ $\qquad$ $988 \div 38$

DIVIDING BY THREE FIGURES

How many boxes will be needed for 4608 crayons, if each box holds 144?

We find out by dividing.

32	14 is contained in 46 three times.
144)4608	Write 3 over 0. $3 \times 144 = 432$.
432	$460 - 432 = 28$. Bring down 8.
288	14 is contained in 28 twice. Write
288	2 over 8. $2 \times 144 = 288$.
0	32 boxes will be needed.

1. $841\overline{)618146}$ $932\overline{)862132}$ $623\overline{)459534}$
2. $756\overline{)722745}$ $918\overline{)317631}$ $101\overline{)87269}$
3. $426\overline{)232172}$ $741\overline{)369018}$ $921\overline{)170395}$

STUDYING TWO-STEP PROBLEMS

James went to the store with a two-dollar bill. He bought 5 cans of peas at 16 cents a can. How much change did he receive?

Study Plan: What does the problem tell? The problem tells us that James went to the store with a two-dollar bill and that he bought 5 cans of peas at 16 cents a can.

First Step: Find the cost of the peas.

Second Step: Find the difference between the cost of the peas and two dollars.

Give the study plan and the steps for each of these problems:

1. Jennie went to the store for her mother. She bought 3 dozen oranges at 48¢ a dozen. She gave the clerk a five-dollar bill. How much change should she have received?

2. Mabel bought ½ dozen eggs at 52¢ a dozen and a bag of flour for $1.98. How much did she spend for all?

3. Tom had $5.20. His father gave him $4.80 more to pay for a trip to the country. While he was away from home Tom spent $5.78. How much did he have left?

4. Mrs. Jones used $4.28 worth of gas and $3.75 worth of electricity during the month of December. Her bill for gas and electricity in November was $4.90. Her bill for gas and electricity in December was how much more than her bill in November?

5. Mrs. Jones kept an account of the cost of food during the week. She spent $6.05 for vegetables; $8.92 for meat; $1.40 for bread. How much did she spend for all? How much more did the meat cost than the vegetables and bread together?

6. New suits for a scout troop of 22 boys cost $168.30, and hats for the whole troop cost $49.50. What did each boy have to pay for his suit? For his hat? For both together?

7. Jennie's mother bought 2 pecks of potatoes at $1.90 a bushel and a barrel of apples at $4.60 a barrel. How much did she pay for all?

SALES SLIPS

Here is a sales slip as it looks when it is filled out with two purchases.

Below the name of the firm there are places for the date, the name, and the address of the purchaser. When the purchaser pays cash and carries home the purchase, his name and address are usually not written on the slip.

Dey Brothers & Co.

Syracuse, N. Y., April 14 192__

Mrs. James Burnet

Address 849 Kingsbury Place

1	handkerchief		.30
1	tie		.75
			1.05

There are places to show what articles were purchased, how many of a kind, the prices of the articles and the amount received by the clerk.

With paper and a ruler make copies of this sales slip and fill them in to show these purchases:

1. October 1 this year Mr. George Brown of 184 Fayette Street buys a hat for $4.75 and a tie for $2.

2. December 17 this year Mrs. John Tanner of 305 State Street buys 2 yards of ribbon at 25¢ a yard and a collar for 75¢.

KEEPING A CASH ACCOUNT

Mary keeps in a small blank book an account of all the money she receives and spends. This is called keeping a cash account.

Here is a page from Mary's cash account for September. The line in the space for figures separates the places for dollars and cents.

RECEIVED				PAID			
Sept. 3	Allowance	$	30	Sept. 9	Pencils	$	10
" 10	"		30	" 12	Candy		10
" 12	For errand		10	" 15	Note book		15
" 17	Allowance		30	" 21	Ice cream		10
" 20	For errand		25	" 25	Stamps		08
" 24	Allowance		30	" 30	Balance on hand	1	02
		$	1 55			$	1 55

The *balance* is the amount of money Mary had left at the end of the month. If the balance is added to the amount that she spent, it should equal the amount that was received.

At the end of the month, Mary's father asked her how much she had spent. How much was it? How much had she saved? How much had she earned?

KEEPING A CASH ACCOUNT

RECEIVED				PAID			
Sept. 4	Allowance	$	25	Sept. 5	Ice cream cone	$	05
" 6	For errand		20	" 10	Ball game		25
" 11	Allowance		25	" 20	Trolley fare		08
" 16	From Mother		25	" 24	For fruit		15
" 18	Allowance		25	" 30	Ice cream cone		05
" 20	For errand		10		Balance		97
" 25	Allowance		25				
		$	1 55			$	1 55

Here is a page from Tom's cash account.

To find the *balance,* add the amounts that were paid out and subtract this sum from the sum of the amounts received.

Draw lines on a sheet of paper to make it look like Tom's page. Use the figures in the following problems to make cash accounts. Balance the accounts.

1. Bob received: August 1, allowance, 25¢; August 2, 25¢ for mowing lawn; August 3, 10¢ for errand; August 5, for errand, 15¢. He paid on August 1, 15¢ for a ticket to the movies; August 2, 5¢ for an ice cream cone; August 4, 20¢ for share of expense for a picnic; August 6, 15¢ for fish hooks.

2. A farmer's wife made the following sales and purchases on market day. She received $2.40 for eggs; $4.25 for strawberries; $2.25 for lettuce; $1.75 for bunches of flowers; $12.00 for chickens. She spent 15¢ for lettuce seed, $6.60 for shoes, $4.20 for stockings, 36¢ for bananas.

Use a small blank book and begin to keep your own cash account.

A FRACTION AND ITS TERMS

You have learned to use simple fractions. You know that one of the two equal parts of an apple is called $\frac{1}{2}$ of an apple. You can find $\frac{1}{2}$ of anything by dividing it into 2 equal parts.

An apple, a foot, an inch, a dozen eggs, or anything considered as a whole thing is called a *unit*.

One, or more, of the equal parts of a unit is called a *fraction*. $\frac{1}{2}$, $\frac{2}{3}$ and $\frac{3}{4}$ are *fractions*.

The number below the line of a fraction is called the *denominator*.

In the fraction $\frac{2}{3}$, 3 is the denominator.

The *denominator* shows into how many equal parts the unit is divided.

Name the *denominator* of each of these fractions, and tell what each denominator shows:

$\frac{3}{4}$ $\frac{5}{6}$ $\frac{7}{8}$ $\frac{7}{9}$ $\frac{2}{3}$ $\frac{6}{7}$ $\frac{4}{5}$

The number above the line is called the *numerator*. In the fraction $\frac{2}{3}$, the numerator is 2. It shows how many equal parts are taken.

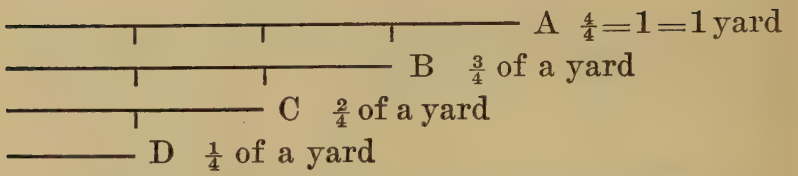
Name the *numerator* of each of these fractions, and tell what each numerator shows:

$\frac{1}{2}$ $\frac{2}{5}$ $\frac{5}{6}$ $\frac{3}{8}$ $\frac{7}{8}$ $\frac{4}{7}$ $\frac{8}{9}$ $\frac{6}{8}$

Write a fraction whose denominator is 7 and whose numerator is 5. One whose denominator is 9 and whose numerator is 2. What does each number show?

The numerator and denominator are called the *terms* of a fraction.

LEARNING TO USE FOURTHS



1. Draw a line one yard long on the blackboard. Call it line A. Divide it into 4 equal parts.

2. What part of a yard is one of the four equal parts? How many fourths equal one yard? Write after A "$\frac{4}{4}$ of a yard = 1 yard."

3. Draw a line as long as one of the fourths. Call it line D. Write after D "$\frac{1}{4}$ of a yard."

4. Draw a line as long as two of the fourths. Call it line C. Write after C "$\frac{2}{4}$ of a yard."

5. Draw a line as long as three of the fourths. Call it line B. Write after B "$\frac{3}{4}$ of a yard."

6. Look at the lines on this page. A stands for 1 yd. or $\frac{4}{4}$ of a yard.

The line D is what part of A? A + D = how many fourths of a yard?

The line C is what part of A? A + C = how many fourths of a yard?

The line B is what part of A? A + B = how many fourths of a yard?

7. How many fourths would there be in two lines like A? Write the fraction which shows your answer.

8. How many fourths are there in A+B+C+D? Write the fraction which shows your answer.

KINDS OF FRACTIONS

When the numerator is less than the denominator, the fraction is called a *proper fraction*.

$\frac{3}{4}$, $\frac{2}{3}$ and $\frac{5}{6}$ are proper fractions. Can you tell why?

When the numerator is equal to or larger than the denominator, the fraction is called an *improper fraction*.

$\frac{4}{4}$, $\frac{7}{4}$ and $\frac{6}{5}$ are improper fractions. Why?

The figure 6 is a *whole number*. $\frac{3}{5}$ is a *fraction*.

A whole number and a fraction used together make a *mixed number*.

$6\frac{3}{5}$ is a mixed number. Give some other mixed numbers.

WORKING WITH FRACTIONS

1. Which of these are proper fractions?

$\frac{3}{4}$ $\frac{4}{3}$ $\frac{4}{5}$ $\frac{7}{9}$ $\frac{3}{2}$ $\frac{5}{10}$ $\frac{6}{5}$ $\frac{8}{9}$

2. Which of these are improper fractions?

$\frac{1}{6}$ $\frac{3}{2}$ $\frac{4}{7}$ $\frac{5}{3}$ $\frac{8}{7}$ $\frac{9}{10}$ $\frac{6}{8}$ $\frac{7}{5}$

3. Change these whole numbers to fractions and name the kind of fraction in each answer.

$1 = \frac{}{2}$ $2 = \frac{}{2}$ $3 = \frac{}{2}$ $4 = \frac{}{2}$ $5 = \frac{}{2}$ $6 = \frac{}{2}$

4. Change these mixed numbers to fractions and tell what kind of a fraction each answer is called.

$1\frac{1}{2} = \frac{}{2}$ $2\frac{1}{2} = \frac{}{2}$ $3\frac{1}{2} = \frac{}{2}$

$4\frac{1}{2} = \frac{}{2}$ $5\frac{1}{2} = \frac{}{2}$ $6\frac{1}{2} = \frac{}{2}$

These circles are divided into fourths.

There are 5 circles and $\frac{1}{4}$ of a circle.

Five and one-fourth is written $5\frac{1}{4}$.

Count the fourths in 1 circle; in 2 circles.

How many fourths are there in 3 circles? In 5 circles?

Count the fourths in $1\frac{1}{4}$ circles; in $2\frac{3}{4}$ circles.

$5\frac{1}{4}$ circles $= \frac{21}{4}$ circles. Prove this by counting.

One circle has $\frac{4}{4}$, so 5 circles have $\frac{20}{4}$ and $5\frac{1}{4}$ circles have $\frac{21}{4}$ circles.

$$5\tfrac{1}{4} = 5 \times \tfrac{4}{4} + \tfrac{1}{4} = \tfrac{21}{4}$$

Change the following to fourths and prove your answer by counting the fourths in the circles:

$3\frac{3}{4}$, $1\frac{1}{4}$, $4\frac{3}{4}$, $1\frac{3}{4}$, $2\frac{3}{4}$, $4\frac{2}{4}$, 3, 2

Study the circles again.

How many whole circles are there in $\frac{4}{4}$ of a circle? In $\frac{20}{4}$ circles? In $\frac{12}{4}$ circles?

How many whole circles and fourth circles over are there in $\frac{7}{4}$ circles? In $\frac{15}{4}$ circles?

A short way to find out that $\frac{15}{4} = 3\frac{3}{4}$ is to divide 15 by 4.

$$4\overline{)15}$$

3 and 3 remainder or $3\frac{3}{4}$.

In the same way change these fractions to whole numbers or mixed numbers:

$\frac{15}{4}$, $\frac{8}{4}$, $\frac{16}{4}$, $\frac{12}{4}$, $\frac{5}{4}$, $\frac{9}{4}$, $\frac{11}{4}$, $\frac{17}{4}$, $\frac{20}{4}$

MORE ABOUT FRACTIONS

$\frac{4}{4}$ of a dozen are how many dozen?

$1\frac{2}{4}$ dozen are how many dozen? $1\frac{7}{4}$? $\frac{5}{4}$? $\frac{7}{4}$? $\frac{6}{4}$? $\frac{8}{4}$? $1\frac{2}{4}$?

Give the missing numbers:

$4 = \frac{}{4}$	$4\frac{1}{4} = \frac{}{4}$	$4\frac{2}{4} = \frac{}{4}$	$4\frac{3}{4} = \frac{}{4}$
$5 = \frac{}{4}$	$5\frac{1}{4} = \frac{}{4}$	$5\frac{2}{4} = \frac{}{4}$	$5\frac{3}{4} = \frac{}{4}$
$1\frac{6}{4} = ?$	$1\frac{7}{4} = ?$	$1\frac{2}{4} = ?$	$\frac{4}{4} = ?$
$\frac{5}{4} = ?$	$1\frac{1}{4} = ?$	$1\frac{0}{4} = ?$	$2\frac{1}{4} = ?$

ADDING FRACTIONS

It took $\frac{3}{4}$ of a yard to make the large sail for Tom's boat and $\frac{2}{4}$ of a yard for the smaller sail. How much cloth was needed for both sails? We find out by adding $\frac{3}{4}$ and $\frac{2}{4}$. This example can be written in different ways.

$\frac{3}{4} + \frac{2}{4} = \frac{5}{4} = 1\frac{1}{4}$		$\frac{3}{4}$ of a yard and $\frac{2}{4}$ of a yard are $\frac{5}{4}$ of a yard.
$\frac{3}{4}$	3 fourths	$\frac{5}{4}$ of a yard are 1 whole yard and $\frac{1}{4}$ of a yard, or $1\frac{1}{4}$ yards.
$\frac{2}{4}$	2 fourths	
$\frac{5}{4} = 1\frac{1}{4}$	5 fourths	

Write in columns and add:

1. $\frac{4}{4} + \frac{1}{4}$ $\quad \frac{3}{4} + \frac{1}{4}$ $\quad \frac{2}{4} + \frac{3}{4}$ $\quad \frac{1}{4} + \frac{2}{4}$
2. $\frac{2}{4} + \frac{4}{4}$ $\quad \frac{1}{4} + \frac{1}{4}$ $\quad \frac{4}{4} + \frac{3}{4}$ $\quad \frac{2}{4} + \frac{2}{4}$
3. $\frac{4}{4} + \frac{3}{4} + \frac{2}{4} + \frac{1}{4}$

SUBTRACTING FRACTIONS

From $\frac{3}{4}$ of a dozen eggs mother used $\frac{2}{4}$ dozen. How many were left? We find out by subtracting $\frac{2}{4}$ from $\frac{3}{4}$. This example can be written in different ways.

$\frac{3}{4} - \frac{2}{4} = \frac{1}{4}$

$\frac{3}{4}$	3 fourths
$-\frac{2}{4}$	-2 fourths
$\frac{1}{4}$	1 fourth

$\frac{3}{4}$ of a dozen $-\frac{2}{4}$ of a dozen $= \frac{1}{4}$ of a dozen. There were $\frac{1}{4}$ dozen left.

Write in columns and subtract:

1. $\frac{4}{4} - \frac{1}{4}$ $\quad 2\frac{1}{4} - 1$ $\quad 3\frac{3}{4} - 1\frac{1}{4}$
2. $3\frac{1}{4} - 1\frac{1}{4}$ $\quad 2\frac{3}{4} - 2\frac{1}{4}$ $\quad 3\frac{3}{4} - 2\frac{2}{4}$

PROBLEMS

1. Jimmy had $2\frac{3}{4}$ dozen marbles. He lost $\frac{2}{4}$ of a dozen. How many dozen were left?

2. A melon was cut into $\frac{4}{4}$. I ate $\frac{1}{4}$. What part of the melon was left?

3. Mother bought $3\frac{3}{4}$ dozen apples. The children ate $\frac{3}{4}$ of a dozen. How many dozen were left?

4. Two dozen lead soldiers come in a box. Take out $\frac{1}{4}$ of a dozen and how many will be left?

5. Tom lived $2\frac{3}{4}$ miles from the swimming pool. Jimmy lived $\frac{1}{4}$ mile nearer than Tom did. How far from the pool did Jimmy live?

6. Some boys ate $\frac{1}{4}$ of a dozen doughnuts. How many fourths of the dozen were left?

FRACTIONAL PARTS

Twenty-four lead soldiers come in a box. $\frac{3}{4}$ of them are carrying guns. How many have guns?

This is how we find $\frac{3}{4}$ of 24 soldiers:

$\begin{array}{r} 6 \\ 4\overline{)24} \end{array}$	To find $\frac{1}{4}$ of 24, we divide 24 by 4. $24 \div 4 = 6$.
$6 = \frac{1}{4}$ of 24	$\frac{3}{4}$ of 24 is 3 times as many as $\frac{1}{4}$ of 24, so we multiply by 3.
$\begin{array}{r} 3 \\ \hline 18 \end{array}$	$3 \times 6 = 18$.
$18 = \frac{3}{4}$ of 24	18 soldiers have guns.

Find:

$\frac{3}{4}$ of 36	$\frac{2}{4}$ of 12	$\frac{1}{4}$ of 72	$\frac{2}{4}$ of 48	$\frac{3}{4}$ of 28
$\frac{2}{3}$ of 18	$\frac{3}{4}$ of 32	$\frac{2}{3}$ of 30	$\frac{3}{4}$ of 20	$\frac{2}{3}$ of 9
$\frac{1}{3}$ of 36	$\frac{2}{3}$ of 24	$\frac{1}{2}$ of 48	$\frac{2}{3}$ of 27	$\frac{1}{3}$ of 72

PROBLEMS

1. It takes $\frac{3}{4}$ of a yard to make a doll's dress. How many inches is that?

2. Thirty-six children were asked to my party. $\frac{2}{3}$ of them came. How many children were there?

3. Mother hid 128 peanuts for a peanut hunt. We found $\frac{3}{4}$ of them. How many did we find?

4. If you go on a 30 mile bicycle trip, how far have you gone when you have covered $\frac{1}{2}$ of the distance?

5. Molly saved 45 cents and spent $\frac{4}{5}$ of it to buy her mother a Christmas present. How much did the present cost?

USING FRACTIONS IN PLAYING STORE

Jane's class played store. She was the clerk. She made out this sales slip for one customer. Is it correct?

Jan. 2 192__

Miss Alice Jones
302 Union Street

¼ lb.	Chocolates at 40¢ a lb.		10
¼ lb	Jelly beans at 28¢ a lb		07
¼ lb.	Nut candy at 36¢ a lb		09
			26

Play you are a clerk in a store and make a sales slip for each of these sales. Date your slips to-day:

1. ¼ lb. of fudge at . . . . . 20¢ a lb.
   ½ lb. of chocolates at . . . . . 32¢ a lb.
   ⅓ lb. of peppermints at . . . . . 24¢ a lb.
2. ¾ yd. of ribbon at . . . . . 16¢ a yd.
   ⅔ yd. of ribbon at . . . . . 18¢ a yd.
   ¼ yd. of ribbon at . . . . . 36¢ a yd.
3. ½ yd. of lace at . . . . . 32¢ a yd.
   ¾ yd. of cloth at . . . . . 28¢ a yd.
   ⅓ yd. of ribbon at . . . . . 12¢ a yd.
4. ¼ lb. of butter at . . . . . 48¢ a lb.
   ¾ lb. of lard at . . . . . 24¢ a lb.
   ½ lb. of tea at . . . . . 60¢ a lb.

A FANCY DRESS PARTY

1. Jean made her own costume for the fancy dress party the fourth grade gave in the gymnasium. She had $2\frac{3}{8}$ yards of yellow crepe paper and $\frac{3}{8}$ of a yard of blue. How many yards is that?

2. Mrs. Brown had $2\frac{5}{6}$ yards of red cloth. She used $1\frac{1}{6}$ yards for a pirate sash for Bill and the rest for a gypsy skirt for Mary. How much cloth did she use for Mary's skirt?

3. Peggy, Rose and Nan bought 6 yards of tinsel for fairy costumes. Peggy used $2\frac{3}{4}$ yards, Rose, $1\frac{1}{4}$ yards. How many yards were left for Nan?

4. Bob's clown suit was made from $2\frac{1}{3}$ yards of red cloth and $1\frac{2}{3}$ yards of yellow. How many yards of cloth were there in his costume?

5. The gymnasium was trimmed with colored lanterns. $\frac{1}{5}$ of them were yellow. $\frac{2}{5}$ of them were red. The rest were green. What part of them were green?

MIXED NUMBERS AND IMPROPER FRACTIONS

Change these improper fractions to whole or mixed numbers and tell what each of your answers is called.

$\frac{10}{5} =$ $\frac{145}{5} =$ $\frac{8}{5} =$ $\frac{13}{6} =$ $\frac{30}{6} =$ $\frac{180}{6} =$

$\frac{35}{7} =$ $\frac{15}{7} =$ $\frac{40}{8} =$ $\frac{25}{8} =$ $\frac{10}{9} =$ $\frac{180}{10} =$

Add. Then change all improper fractions to whole or mixed numbers:

$\frac{3}{5} + \frac{4}{5} =$ $1\frac{2}{5} + 2\frac{1}{5} =$ $\frac{2}{5} + \frac{4}{5} + \frac{3}{5} =$

$\frac{5}{6} + \frac{1}{6} =$ $3\frac{2}{6} + 1\frac{1}{6} =$ $\frac{3}{6} + \frac{1}{6} + \frac{4}{6} =$

$\frac{4}{7} + \frac{6}{7} =$ $1\frac{1}{7} + 2\frac{1}{7} =$ $1\frac{1}{7} + 2\frac{2}{7} + 3\frac{3}{7} =$

$\frac{5}{10} + \frac{6}{10} =$ $1\frac{1}{9} + 5\frac{4}{9} =$ $2\frac{3}{8} + 1\frac{2}{8} + 3\frac{1}{8} =$

Subtract:

$\frac{4}{5} - \frac{1}{5} =$ $2\frac{4}{5} - 1\frac{1}{5} =$ $\frac{5}{6} - \frac{2}{6} =$ $4\frac{4}{6} - 1\frac{2}{6} =$

$\frac{4}{7} - \frac{3}{7} =$ $1\frac{7}{8} - 1\frac{5}{8} =$ $3\frac{2}{9} - 2\frac{1}{9} =$ $\frac{9}{10} - \frac{7}{10} =$

$1\frac{3}{4} - 1\frac{3}{4} =$ $3\frac{1}{4} - 3 =$ $\frac{6}{7} - \frac{5}{7} =$ $\frac{3}{7} - \frac{1}{7} =$

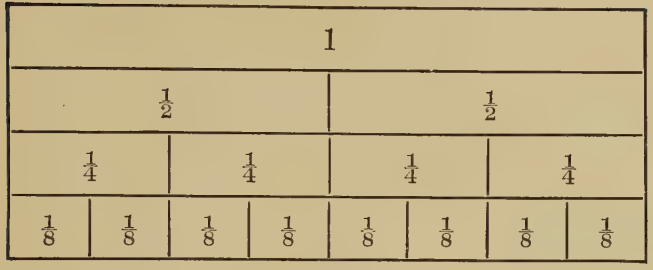
$2\frac{5}{8} - 1\frac{1}{8} =$ $2\frac{3}{8} - \frac{1}{8} =$ $4\frac{3}{5} - 1\frac{1}{5} =$ $\frac{4}{5} - \frac{2}{5} =$

Write 5 proper fractions.

Write 5 improper fractions.

Write 5 mixed fractions.

HALVES, FOURTHS AND EIGHTHS



The drawing will help you answer these questions.

1. $1 = ?$ halves?
2. $1 = ?$ fourths?
3. $1 = ?$ eighths?
4. $\frac{1}{4} = ?$ eighths?
5. $\frac{2}{4} = ?$ eighths?
6. $\frac{3}{4} = ?$ eighths?
7. $\frac{4}{8} = ?$ fourths?
8. $\frac{4}{8} + \frac{2}{8} = ?$ eighths?
9. $\frac{2}{4} + \frac{1}{4} = ?$ fourths?
10. $\frac{6}{8} - \frac{2}{8} = ?$ eighths?
11. $\frac{2}{2} - \frac{1}{2} = ?$ halves?
12. $\frac{8}{8} - \frac{6}{8} = ?$ eighths?

From the drawing you can see that $\frac{1}{2} = \frac{2}{4} = \frac{4}{8}$.

This shows you that a fraction can be expressed in different ways without changing its value.

In the fraction, $\frac{2}{4}$, both the numerator and the denominator are twice as large as in the fraction, $\frac{1}{2}$.

To change $\frac{1}{2}$ to $\frac{2}{4}$, we multiply both the numerator and the denominator by 2. $\frac{1}{2} = \frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$.

To change $\frac{2}{4}$ to $\frac{4}{8}$, we multiply both the numerator and denominator by 2. $\frac{2}{4} = \frac{2}{4} \times \frac{2}{2} = \frac{4}{8}$.

Multiplying both terms of a fraction by the same number does not change the value of the fraction.

$$\frac{1}{2} = \frac{2}{4} = \frac{4}{8} = \frac{8}{16} = \frac{16}{32}$$

THIRDS AND SIXTHS

1					
$\frac{1}{3}$		$\frac{1}{3}$		$\frac{1}{3}$	
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

The drawing will help you answer these questions:

1. $\frac{1}{3} = ?$ sixths?
2. $\frac{2}{3} = ?$ sixths?
3. $\frac{3}{3} = ?$ sixths?
4. $\frac{2}{6} = ?$ thirds?
5. $\frac{4}{6} = ?$ thirds?
6. $\frac{6}{6} = ?$ thirds?
7. $\frac{1}{3} + \frac{1}{3} = ?$ thirds?
8. $\frac{2}{6} + \frac{2}{6} = ?$ sixths?
9. $\frac{3}{6} + \frac{1}{6} = ?$ sixths?
10. $\frac{5}{6} - \frac{1}{6} = ?$ sixths?
11. $\frac{6}{6} - \frac{4}{6} = ?$ sixths?
12. $\frac{3}{6} - \frac{1}{6} = ?$ sixths?

From the drawing you can see that $\frac{4}{6} = \frac{2}{3}$.

The fractions $\frac{4}{6}$ and $\frac{2}{3}$ have different numerators and denominators, but they are exactly equal in value.

To change $\frac{4}{6}$ to $\frac{2}{3}$ we divide both the numerator and denominator by 2. $\frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$.

Dividing both terms of a fraction by the same number does not change the value of the fraction.

Change:

$\frac{4}{8}$ to fourths $\frac{2}{4}$ to halves $\frac{6}{6}$ to thirds $\frac{4}{16}$ to fourths

$\frac{6}{6}$ to halves $\frac{8}{16}$ to eighths $\frac{4}{6}$ to thirds $\frac{8}{16}$ to fourths

FIFTHS AND TENTHS

1									
$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$	
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$

The drawing will help you answer these questions:

1. $\frac{1}{5} = ?$ tenths?
2. $\frac{2}{5} = ?$ tenths?
3. $\frac{3}{5} = ?$ tenths?
4. $\frac{4}{5} = ?$ tenths?
5. $\frac{5}{5} = ?$ tenths?
6. $\frac{4}{10} = ?$ fifths?
7. $\frac{2}{10} = ?$ fifths?
8. $\frac{6}{10} = ?$ fifths?
9. $\frac{10}{10} = ?$ fifths?
10. $\frac{8}{10} = ?$ fifths?

We have learned to add and subtract fractions whose denominators are the same.

$$\frac{3}{4}+\frac{2}{4}=\frac{5}{4}=1\frac{1}{4} \qquad \frac{3}{4}-\frac{2}{4}=\frac{1}{4}$$

Before we can add or subtract fractions whose denominators are not the same, we must make them the same.

To add $\frac{1}{5}$ and $\frac{2}{10}$ we must change fifths to tenths or tenths to fifths in this way:

$$\frac{1}{5}=\frac{2}{10} \qquad \textit{or} \qquad \frac{1}{5}=\frac{1}{5}$$
$$\frac{2}{10}=\frac{2}{10} \qquad\qquad \frac{2}{10}=\frac{1}{5}$$
$$\frac{4}{10}=\frac{2}{5}\text{ sum} \qquad\qquad \frac{2}{5}\text{ sum}$$

Subtract $\frac{2}{4}-\frac{2}{8}$.

$$\frac{2}{4}=\frac{4}{8} \qquad \textit{or} \qquad \frac{2}{4}=\frac{2}{4}$$
$$\frac{2}{8}=\frac{2}{8} \qquad\qquad \frac{2}{8}=\frac{1}{4}$$
$$\frac{2}{8}=\frac{1}{4}\text{ difference} \qquad\qquad \frac{1}{4}\text{ difference}$$

UNLIKE DENOMINATORS

Bob has ridden $2\frac{4}{5}$ miles on his bicycle. He has $1\frac{3}{10}$ miles still to ride to reach home. How far from home was he to begin with?

We find out by adding.

$2\frac{4}{5} = 2\frac{8}{10}$
$1\frac{3}{10} = 1\frac{3}{10}$
$3\frac{11}{10} = 4\frac{1}{10}$ Bob was $4\frac{1}{10}$ miles from home.

Add:

1. $3\frac{1}{2} + 4\frac{1}{8}$
2. $6\frac{3}{8} + 2\frac{1}{4}$
3. $5\frac{1}{2} + 1\frac{3}{4}$
4. $1\frac{1}{6} + 2\frac{1}{3}$
5. $4\frac{5}{6} + 3\frac{2}{3}$
6. $2\frac{1}{3} + 3\frac{1}{6}$
7. $2\frac{1}{10} + 1\frac{1}{5}$
8. $3\frac{2}{5} + 4\frac{7}{10}$
9. $1\frac{4}{5} + 1\frac{3}{10}$

All the children marched out of Franklin School in $2\frac{1}{6}$ minutes during a fire drill. It took them $4\frac{2}{3}$ minutes to march in again. In how much less time did they march out?

We find out by subtracting.

$4\frac{2}{3} = 4\frac{4}{6}$
$2\frac{1}{6} = 2\frac{1}{6}$
$2\frac{3}{6} = 2\frac{1}{2}$ The children marched out in $2\frac{1}{2}$ minutes less than they marched in.

Subtract:

1. $5\frac{1}{5} - 1\frac{1}{10}$
2. $3\frac{4}{5} - 1\frac{7}{10}$
3. $2\frac{3}{10} - 1\frac{1}{5}$
4. $4\frac{1}{2} - 1\frac{3}{8}$
5. $3\frac{3}{8} - 1\frac{1}{4}$
6. $2\frac{1}{4} - 1\frac{1}{8}$
7. $3\frac{1}{3} - 2\frac{1}{6}$
8. $4\frac{2}{3} - 1\frac{1}{6}$
9. $3\frac{5}{6} - 1\frac{2}{3}$

You should be able to do any one of these tests in ten minutes. Copy only when necessary.

Test I

1. 709
   46
   329
   587
   98

2. 609×48

3. $7036 - 3275$

4. Divide 56470 by 48

5. Mother used $\frac{3}{8}$ of a cake at her party. She gave $\frac{1}{8}$ of the cake to each person. How many did she serve?

Test II

1. When bananas are selling at 40¢ a dozen, how many can you buy for 10 cents?

2. 2447
   6809
   9370
   468

3. $58\overline{)65327}$

4. 2907
   $\times 216$

5. 2001
   -453

6. 18 in. = what part of a yard?

Test III

1. $7\overline{)1404}$

2. \$98.09
   $\times 47$

3. 3650
   -986

4. Add \$46.27 + \$.97 + \$1.04 + \$13.75.

5. During one month a laborer worked 24 days and was paid \$4.85 a day. How much had he left after paying \$45 for rent?

SELF-RATING TEST FOR CORRECT WORK
AN EXERCISE IN SILENT READING

1. $87+70$ $56+89$ $95+57$

   $96+9$ $58+95$

2.

9	5	8	6	9	8	9	8	7	9
8	8	7	9	5	4	9	9	9	6
7	9	4	4	8	3	9	8	7	7
6	7	6	5	7	9	6	9	8	8
5	8	9	7	6	8	8	4	5	8

3. $97-29$ $68-39$ $81-45$

   $53-14$ $76-48$

4. 87×56 99×67 80×77 29×403

5. $29\overline{)755}$ $68\overline{)3196}$ $24\overline{)2520}$ $14\overline{)6580}$

6. $39\times\$67.12$ $\$287.50-\$98.62$ $\$99.84\div12$

   $\$789.05+\$903.00+\$472.66+\$57.48$

You can rate yourself easily on this test. First have your teacher mark all incorrect answers. For each wrong answer:

In exercise 1, take off 2.

In exercise 2, take off 1.

In exercise 3, take off 4.

In exercises 4, 5 and 6 take off 5.

Add the points taken off. Subtract the sum from 100. The answer is your mark.

Based on the Latest Investigations Regarding the Relative Difficulty of the Number Combinations

These tests are to determine the combinations upon which each individual pupil needs study and to prevent waste of time in drilling on what he already knows.

Those tests marked A include the 100 combinations in addition, subtraction and multiplication and the 90 combinations in division, arranged in order of difficulty, with the easiest first. The pupil should work across the page from left to right. When his answers for any of these tests have been checked, he should copy and study those combinations which he has failed to give correctly. When he knows all of the combinations in the first addition test, 1A, he is ready for the second addition test, 1B.

The tests marked B are harder than the A tests. They include, in examples, the combinations of the corresponding A tests. That is the examples in 1B include the combinations in 1A.

Each A test should be followed by its corresponding B test. The addition and subtraction tests, and the multiplication and division tests should be alternated. Should a teacher prefer to complete the drill on the combinations of any one process, the tests in that process will be found similarly placed on succeeding pages.

The B tests for the borrowing method in subtraction are given on page 314.

Two or three minutes should be allowed for each A test in addition or subtraction, and three or four minutes for each A test in multiplication or division. The time for each B test should vary from two to four minutes.

TEST 1A (FIRST 25 ADDITIONS). ADD:

		0	5	2	3	1	3	1
		0	5	2	3	2	1	1
6	7	1	8	2	0	0	1	1
1	1	6	1	9	4	2	4	3
8	4	9	4	7	2	0	5	8
2	5	9	4	7	3	5	1	8

TEST 1B (FIRST 25 ADDITIONS). ADD:

3	2	1	2
50	21	31	63	10
50	22	11	13	32
1	4	80	9	2
80	70	72	4	88
24	74	13	55	71

TEST 2A (FIRST 25 SUBTRACTIONS). SUBTRACT:

		0	5	3	7	1	8	3
		0	1	2	7	1	1	3
4	5	6	4	9	9	3	5	6
4	3	6	2	1	9	0	4	0
5	9	6	3	2	7	6	9	4
2	0	1	1	1	1	5	8	1

TEST 2B (FIRST 25 SUBTRACTIONS). SUBTRACT:

3810	5037	1656	2930
3110	1027	1120	1010
4456	5399	3467	3359
2436	4019	2151	3038

TEST 3A (SECOND 25 ADDITIONS). ADD:

		6	1	8	9	0	9	4
		6	7	0	2	6	1	1
4	1	5	2	1	2	1	3	5
2	9	2	7	8	8	0	4	4
2	2	2	5	9	2	0	4	3
4	0	1	0	3	6	1	6	8

TEST 3B (SECOND 25 ADDITIONS). ADD:

2	2	1	4	2
31	52	65	42	15
40	44	62	10	92
1	4	2	5	9
28	35	90	94	40
80	80	36	16	51

TEST 4A (SECOND 25 SUBTRACTIONS). SUBTRACT:

		8	4	5	5	6	4	2
		4	0	5	0	3	3	2
10	10	6	2	7	6	7	8	10
1	2	2	0	0	4	2	8	5
9	11	12	8	1	8	7	7	9
5	2	6	0	0	7	3	5	3

TEST 4B (SECOND 25 SUBTRACTIONS). SUBTRACT:

5648	1045	1062	8762
5304	130	222	8040
1079	1217	1188	1097
525	603	270	235

TEST 5A (THIRD 25 ADDITIONS). ADD:

		3	0	4	0	9	6	0
		0	3	0	8	0	3	7
7	1	3	0	6	4	8	3	5
0	5	2	9	0	3	3	9	3
2	3	7	4	8	3	5	3	4
5	5	2	7	4	7	6	6	8

TEST 5B (THIRD 25 ADDITIONS). ADD:

1	7	3	3	9
63	50	86	30	23
32	32	40	19	40
8	8	3	4	4
40	54	57	30	30
23	20	50	47	68

TEST 6A (THIRD 25 SUBTRACTIONS). SUBTRACT:

		7	8	10	9	8	12	10
		6	2	7	7	6	8	6
10	9	9	8	10	10	11	14	9
4	4	6	3	9	3	7	7	2
7	12	11	10	11	12	11	13	8
4	9	5	8	3	7	6	6	5

TEST 6B (THIRD 25 SUBTRACTIONS). SUBTRACT:

1087	1089	9028	1274
726	436	3586	937
9900	1100	1101	8312
2629	273	675	4557

TEST 7A (FOURTH 25 ADDITIONS). ADD:

		7	6	6	7	6	9	6
		3	2	5	4	7	4	4
5	4	5	7	8	7	9	6	9
9	9	7	5	9	6	5	9	8
8	8	9	6	5	8	7	7	9
7	5	6	8	8	6	8	9	7

TEST 7B (FOURTH 25 ADDITIONS). ADD:

6	6	7	9	7	8
76	60	64	50	55	70
22	35	60	84	60	59
9	9	9	5	8	7
65	80	86	40	76	90
80	68	40	88	70	69

TEST 8A (FOURTH 25 SUBTRACTIONS). SUBTRACT:

		12	11	12	16	11	12	18
		3	9	4	8	8	5	9
11	14	15	14	15	13	13	13	13
4	8	8	6	6	7	5	8	9
16	15	15	13	17	14	17	16	14
7	7	9	4	9	5	8	9	9

TEST 8B (FOURTH 25 SUBTRACTIONS). SUBTRACT:

1212	1216	1418	1545	1226
383	478	739	558	438
1333	1556	1443	1764	1753
747	867	544	789	869

TEST 9A (FIRST 25 MULTIPLICATIONS). MULTIPLY:

		0	1	2	5	2	7	3
		0	5	2	1	9	1	1
5	1	4	1	8	1	1	6	8
2	7	1	3	1	4	2	1	2
2	1	9	2	1	2	2	9	5
8	9	2	3	6	7	5	1	5

TEST 9B (FIRST 25 MULTIPLICATIONS). MULTIPLY:

521	11	152	859	212	111
5	4	2	1	9	6
6347	121	0	222	212	198
1	7	0	8	3	2

TEST 10A (FIRST 21 DIVISIONS). DIVIDE:

$2\overline{)4}$	$5\overline{)25}$	$2\overline{)10}$	$3\overline{)9}$	$5\overline{)30}$	$6\overline{)36}$	$5\overline{)20}$
$9\overline{)81}$	$2\overline{)6}$	$5\overline{)15}$	$2\overline{)12}$	$1\overline{)0}$	$3\overline{)21}$	$5\overline{)10}$
$2\overline{)16}$	$3\overline{)15}$	$2\overline{)14}$	$4\overline{)20}$	$6\overline{)12}$	$2\overline{)8}$	$1\overline{)7}$

TEST 10B (FIRST 21 DIVISIONS). DIVIDE:

$2\overline{)1048}$	$5\overline{)225}$	$3\overline{)915}$	$5\overline{)310}$	$6\overline{)156}$	
$5\overline{)115}$	$9\overline{)81}$	$1\overline{)70}$	$2\overline{)7752}$	$3\overline{)225}$	$4\overline{)20}$

TEST 11A (SECOND 25 MULTIPLICATIONS). MULTIPLY:

		4	1	2	3	7	3	2
		5	8	1	2	2	3	6
4	2	4	5	6	3	6	3	5
2	4	4	3	2	4	3	5	6
6	4	4	5	5	3	3	9	0
6	6	3	7	4	8	6	5	1

TEST 11B (SECOND 25 MULTIPLICATIONS). MULTIPLY:

394	313	202	543	463	25
5	8	1	4	2	6
367	452	463	4563	55	
2	4	6	3	7	

TEST 12A (SECOND 21 DIVISIONS). DIVIDE:

$7\overline{)14}$	$7\overline{)21}$	$3\overline{)12}$	$5\overline{)40}$	$1\overline{)1}$	$1\overline{)5}$	$1\overline{)4}$
$3\overline{)0}$	$6\overline{)42}$	$6\overline{)0}$	$1\overline{)6}$	$9\overline{)27}$	$5\overline{)35}$	$4\overline{)0}$
$1\overline{)9}$	$4\overline{)12}$	$8\overline{)0}$	$1\overline{)3}$	$3\overline{)6}$	$5\overline{)45}$	$1\overline{)8}$

TEST 12B (SECOND 21 DIVISIONS). DIVIDE:

$7\overline{)224}$	$3\overline{)1206}$	$5\overline{)445}$	$1\overline{)1546}$	$6\overline{)420}$
$9\overline{)27}$	$4\overline{)120}$	$1\overline{)983}$	$8\overline{)00}$	$5\overline{)390}$

TEST 13A (THIRD 25 MULTIPLICATIONS). MULTIPLY:

		7	0	0	9	0	7	0
		5	5	3	3	2	3	4
8	3	5	9	9	0	2	8	3
5	7	9	0	9	6	0	3	0
7	6	4	6	7	0	7	3	4
0	5	0	4	7	9	6	9	8

TEST 13B (THIRD 25 MULTIPLICATIONS). MULTIPLY:

807	8709	73	604	3905
5	3	7	2	9
732	606	707	86	434	49
0	4	6	5	8	0

TEST 14A (THIRD 21 DIVISIONS). DIVIDE:

$7\overline{)0}$	$8\overline{)72}$	$1\overline{)2}$	$4\overline{)16}$	$8\overline{)32}$	$3\overline{)18}$	$7\overline{)35}$
$8\overline{)16}$	$7\overline{)56}$	$6\overline{)54}$	$4\overline{)32}$	$2\overline{)0}$	$9\overline{)0}$	$5\overline{)5}$
$6\overline{)30}$	$9\overline{)18}$	$4\overline{)4}$	$4\overline{)8}$	$5\overline{)0}$	$6\overline{)24}$	$9\overline{)72}$

TEST 14B (THIRD 21 DIVISIONS). DIVIDE:

$7\overline{)560}$	$8\overline{)7392}$	$1\overline{)245}$	$4\overline{)9924}$	$3\overline{)186}$
$7\overline{)364}$	$6\overline{)5724}$	$9\overline{)7380}$	$2\overline{)604}$	$5\overline{)505}$

TEST 15A (FOURTH 25 MULTIPLICATIONS). MULTIPLY:

		1	8	8	0	5	5	6
		0	9	4	8	0	8	0
0	4	8	6	4	8	1	8	7
7	9	8	7	7	0	1	6	4
9	6	9	9	9	6	8	7	7
8	8	4	7	6	9	7	8	9

TEST 15B (FOURTH 25 MULTIPLICATIONS). MULTIPLY:

89	8615	798	805	901
6	0	4	8	1
406	187	769	246	89
7	9	8	9	7

TEST 16A (LAST 27 DIVISIONS). DIVIDE:

$7\overline{)42}$	$3\overline{)24}$	$6\overline{)48}$	$7\overline{)7}$	$9\overline{)45}$	$7\overline{)63}$	$4\overline{)24}$	$6\overline{)18}$	$8\overline{)40}$
$2\overline{)18}$	$9\overline{)54}$	$7\overline{)28}$	$3\overline{)3}$	$6\overline{)6}$	$8\overline{)24}$	$7\overline{)49}$	$3\overline{)27}$	$8\overline{)8}$
$8\overline{)48}$	$9\overline{)36}$	$4\overline{)28}$	$9\overline{)63}$	$2\overline{)2}$	$9\overline{)9}$	$8\overline{)64}$	$8\overline{)56}$	$4\overline{)36}$

TEST 16B (LAST 27 DIVISIONS). DIVIDE:

$7\overline{)4837}$	$3\overline{)2673}$	$6\overline{)4986}$	$9\overline{)4914}$	$4\overline{)3868}$
$8\overline{)6024}$	$2\overline{)394}$	$7\overline{)518}$	$8\overline{)6888}$	$9\overline{)153}$

Subtraction Examples for B Tests, if You Use the Borrowing Method.

TEST 2B (FIRST 25 SUBTRACTIONS). SUBTRACT:

350	817	543	946
210	117	343	126
539	596	236	4967
409	200	111	1851

TEST 4B (SECOND 25 SUBTRACTIONS). SUBTRACT:

548	465	1062	1072
504	330	122	200
876	1098	9778	1221
824	550	3537	260

TEST 6B (THIRD 25 SUBTRACTIONS). SUBTRACT:

1087	1289	1089	1279
726	867	936	942
1109	1520	1211	13922
464	777	385	6567

TEST 8B (FOURTH 25 SUBTRACTIONS). SUBTRACT:

1322	1326	1528	1655
493	588	849	668
1443	1673	1845	15784
857	779	949	9985

INDEX

Accounts, cash, 287, 288
Addends, 190
Addition,
  by endings, 14, 29, 34, 41, 45, 54, 68, 80, 92, 103, 108, 121
  definitions, 3, 190
  development, 3, 4, 9, 17
  dollars and cents, 12, 13, 18, 62, 70, 93, 104, 109, 122, 144, 200, 259
  drill, 5, 12, 15, 17, 18, 22, 23, 26, 28, 29, 30, 32, 33, 36, 42, 44, 46, 54, 56, 62, 69, 70, 81, 93, 104, 108, 109, 121, 122, 125, 140, 156, 190, 191, 194, 195, 197, 198, 200, 211, 248, 255, 256, 259, 265, 267
  fractions, 293, 298, 301, 302
  mixed numbers, 298, 302
  one hundred combinations, 56, 125
  problems, 3, 5, 7, 12, 16, 21, 23, 24, 30, 35, 43, 46, 47, 62, 63, 70, 71, 83, 84, 94, 107, 110, 115, 123, 139, 142, 152, 172, 175, 187, 210, 253, 260, 261, 263, 267, 268, 269, 279, 285
  processes,
    with carrying, 18, 62
    without carrying, 15, 17, 26
  proof or check, 144, 190
  sign of, 3, 190
  terms, 3, 190
  tests, 58, 127, 128, 137, 144, 184, 185, 186, 201, 250, 251, 252, 303, 304, 306-309
  units and tens, 26
Annexing zeros, 176
Arabic numbers, 254
Averages, 268

Bills, 296

Calendar, 204, 205
Cash accounts, 287, 288
Change making, 10, 72, 112, 142
Clock, 60, 61, 192, 196
Coins, 11, 199
Combinations,
  ninety division, 266
  one hundred addition, 56, 125
  one hundred multiplication, 212
Combinations—*Cont'd*
  one hundred subtraction, 57, 126
Counting, 1, 2, 6.

Decades, work in, 14, 15, 22, 29, 30, 34, 36, 41, 45, 46, 68, 69, 71, 80, 81, 92, 93, 103, 104, 105, 108, 109, 111, 121, 122, 123
Decimal point, 18, 59, 70, 98, 144, 200, 214, 282
Degrees, 91
Denominator, 289, 291
  like, 293, 294
  unlike, 301, 302
Difference, 19, 67, 207
Difficult combinations, inside covers,
  addition, 14, 34, 41, 45, 68, 80, 92, 103, 108, 121
  division, 75, 88, 99, 116, 133, 149, 162, 171
  multiplication, 39, 51, 52, 85, 95, 130, 146, 160, 169, 218, 221
  subtraction, 23, 31, 36, 42, 47, 70, 82, 94, 105, 111, 123
Dividend, 119, 238
Division,
  definitions, 75, 238
  development, 75
  dollars and cents, 139, 164, 282
  drill, 88, 99, 116, 119, 120, 133, 138, 139, 140, 141, 149, 151, 153, 154, 155, 162, 164, 166, 171, 174, 177, 183, 238, 239, 241, 248, 267, 270, 271, 272, 274, 276, 278, 281, 282, 284
  long division processes,
    dividing dollars and cents, 282
    division with remainder, 271
    divisor contained in first three figures, 272
    divisor contained in first two figures, 270
    estimating quotient figures, 278
    three-figure divisor, 284
    zero in the quotient, 281
  ninety combinations, 237, 266
  problems, 77, 90, 97, 101, 110, 118, 119, 129, 133, 135, 136, 139, 150,

Division—problems—*Cont'd*
155, 163, 165, 172, 175, 178, 187, 224, 240, 253, 261, 267, 268, 269, 274, 275, 285
proof, 138, 154, 164, 239, 276
short division processes,
dividing dollars and cents, 139
divisor contained in first figure, 138
divisor contained in first two figures, 138
with carrying, 164, 238
with remainder, 119
without remainder, 138
zero in dividend, 154, 164
sign of, 75
tables, 75, 88, 99, 116, 133, 149, 162, 171, 177
terms, 119, 238
tests, 127, 128, 184, 185, 186, 248, 250, 251, 252, 266, 283, 303, 304, 310-313.
Divisor, 119, 238
Dollars and cents, 11, 13, 18, 59, 62, 66, 70, 73, 74, 82, 93, 98, 104, 105, 106, 109, 111, 122, 123, 139, 144, 161, 164, 199, 200, 209, 214, 226, 259, 282
Dozen, 135, 223
Dry measure, 75, 97, 228

Eighth, 163
Estimating answers, 273, 280
Estimating quotient figures, 278
Even numbers, 2

Facts,
ninety divisions, 266
one hundred additions, 56, 125
one hundred multiplications, 212
one hundred subtractions, 57, 126
Factors and multiples, 217
Fifth, 117
Fourth, 100
Fractions,
addition, 293, 298, 301
definitions, 289, 291
development, 76, 89, 100, 117, 134, 150, 163, 172, 178, 242, 244, 290, 292
drill, 101, 118, 135, 246, 291, 292, 293, 294, 295, 298, 302
equivalents, 299, 300, 301
improper, 291, 298
mixed numbers, 291, 298, 302
part-taking tables, 76, 89, 117, 134, 150, 163, 172, 178, 243, 244, 246
problems, 90, 97, 100, 101, 173, 242, 243, 244, 245, 247, 252, 294, 295, 296, 297
processes,
addition of like denominators, 293
addition of unlike denominators, 301, 302
fractional parts, 295
subtraction of like denominators, 294
subtraction of unlike denominators, 301, 302
proper, 291, 298
reduction, 299, 300
subtraction, 294, 298, 301
terms, 289
whole number, 291

Games, devices and projects,
bean bag, 8
blindfold, 7
buying and selling gasoline, 279
buying at a fruit stand, 142
buying for Thanksgiving dinner, 35
buying milk at school, 115
cat and mice, 262
crossing the bridges, 124
device in division, 183
dominoes, 2, 3, 4
fancy dress party, 297
keeping a cash account, 288
measure game, 257
merry-go-round, 38
movies, 114
number chart, 6
number game, 140
playing store, 10, 12, 72, 142, 296
raising money for school pictures, 275
toy money, 9
valentine party, 165
wheel drill, 39, 86
Graded difficulty tests, 305—314

Half, 76, 242

Improper fractions, 291, 298

Length, measure of, 78, 79, 85, 215
Liquid measure, 75, 102, 224

Making change, 10, 72, 112, 142
Making problems, 43, 50, 94, 200, 223, 249, 275, 279
Measures,
  dozen, 135, 223
  dry, 75, 97, 228
  length, 78, 79, 85, 215
  liquid, 75, 102, 224
  temperature, 91
  time, 61, 192, 193, 196, 204
  U. S. money, 11, 13, 199
  weight, 173, 234
Minuend, 67, 207
Minus, 19, 207
Mixed numbers, 291, 298, 302
Money,
  toy, 9
  United States, 11, 13, 59, 199
Multiples and factors, 217
Multiplicand, 106, 213
Multiplication,
  by 10 or 100, 176
  definitions, 38
  development, 38, 39, 40, 51, 86, 96, 113, 131, 147, 161, 170, 219, 222
  dollars and cents, 73, 74, 98, 106, 161, 214, 226
  drill, 73, 74, 87, 96, 98, 101, 105, 106, 113, 115, 117, 120, 132, 140, 148, 151, 161, 167, 170, 180, 181, 182, 212, 213, 214, 219, 222, 225, 226, 229, 230, 233, 235, 248, 262, 264, 265, 267
  one hundred combinations, 212
  problems, 52, 53, 74, 77, 83, 84, 87, 90, 97, 101, 102, 106, 110, 114, 115, 118, 129, 135, 136, 142, 148, 150, 152, 163, 165, 172, 175, 178, 179, 181, 187, 214, 219, 223, 224, 225, 227, 228, 229, 231, 253, 260, 261, 267, 275, 279, 285
  processes,
    multiplication with carrying, 74
Multiplication—processes—*Cont'd*
    multipliers ending in zero, 167, 235
    multiplying by one figure, 213
    multiplying by three figures, 181, 230
    multiplying by two figures, 179
    multiplying dollars and cents, 98, 214
    multiplying two figures, 73, 225
    simple method, 229
    zero in the multiplicand, 98
    zero in the multiplier, 182, 233
  proof, 226
  sign, 38, 213
  tables, 39, 51, 52, 85, 95, 113, 130, 146, 160, 169, 218, 221
  terms, 38, 106, 213
  tests, 58, 127, 128, 184, 185, 186, 232, 250, 251, 252, 265, 303, 304, 310–313
Multiplier, 106, 213

Ninety division combinations, 237
Ninth, 172
Number chart, 6
Numbers,
  Arabic, 254
  chart, 6
  even, 2
  mixed, 291, 298, 302
  odd, 2
  Roman, 60, 189, 196, 254
Numerator, 289, 291

Odd numbers, 2
One hundred addition combinations, 56, 125
One hundred multiplication combinations, 212
One hundred subtraction combinations, 57, 126

Partial products, 225, 233
Part taking tables, 76, 89, 117, 134, 150, 163, 172, 178, 243, 244, 245, 246
Problems,
  in measures, 78, 79, 97, 102, 135, 173, 215, 223, 224, 228, 234, 236, 257
  study of, 136, 143, 168, 280, 284
  two-step, 260, 284

Problems—*Cont'd*
without numbers, 158, 202, 220, 249, 277
Product, 38, 106, 213
Proof,
addition, 144, 190
division, 138, 154, 164, 239, 276
multiplication, 226
subtraction, 67, 207
Proper fractions, 291

Quotient, 119, 238

Reading and writing numbers, 2, 6, 27, 59, 159, 188, 254
Reduction of fractions, 299, 300
Remainders,
division, 119, 238
subtraction, 19, 67, 207
Roman numerals, 60, 189, 196, 254

Sales slips, 286
Seventh, 150
Signs
addition, 3, 190
division, 75
dollars and cents, 11
equality, 3
multiplication, 38, 213
subtraction, 19, 207
Sixth, 134
Subtraction,
by endings, 23, 31, 36, 42, 47, 55, 70, 82, 94, 105, 111, 123
definitions, 19, 207
development, 19, 20
dollars and cents, 66, 82, 105, 111, 123, 209, 259
drill, 19, 20, 28, 31, 37, 42, 47, 48, 49, 55, 57, 65, 66, 67, 71, 82, 94, 105, 111, 123, 124, 126, 151, 167, 203, 206, 207, 208, 209, 211, 248, 255, 258, 259, 265, 267
fractions, 294, 298, 301
mixed numbers, 298, 302
one hundred combinations, 57, 126
problems, 21, 24, 31, 35, 37, 43, 50, 63, 66, 71, 83, 84, 107, 110, 123, 129, 175, 187, 210, 216, 253, 260, 261, 263, 267, 279, 285
processes,
dollars and cents, 66, 209
Subtraction—processes—*Cont'd*
with changes, 48, 64
without changes, 19, 37
with zeros, 49
proof, 67, 207
sign of, 19, 207
terms, 19, 67, 207
tests, 58, 127, 128, 145, 157, 184, 185, 186, 211, 250, 251, 252, 303, 304, 305–309, 314
Subtrahend, 67, 207
Sum, 3, 15, 190

Tables,
division, 75, 88, 99, 116, 133, 149, 162, 171, 177
part taking, 76, 89, 117, 134, 150, 163, 172, 178, 243, 244, 246
measures, 11, 78, 79, 97, 102, 135, 173, 199, 204, 215, 223, 224, 228, 234
multiplication, 39, 51, 52, 85, 95, 113, 130, 146, 160, 169, 218, 221
Temperature, 91
Tenth, 178
Terms, 3, 15, 19, 38, 67, 106, 119, 190, 207, 213, 238, 289
Tests, 58, 127, 128, 137, 144, 145, 157, 184, 185, 186, 201, 211, 232, 248, 250, 251, 252, 265, 266, 283, 303, 304, 305–314
Thermometer, 91
Third, 89, 244
Time, 61, 192, 193, 196, 204, 205
Two-step problems, 260, 284

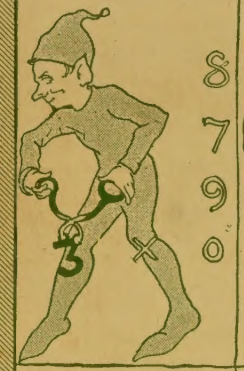
United States money, 11, 13, 59, 62, 199
Units, 25, 26, 27, 159, 289

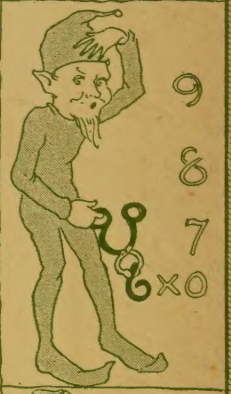
Weight, measure of, 173, 234
Whole numbers, 291
Writing numbers, 2, 27, 59, 159, 188, 254

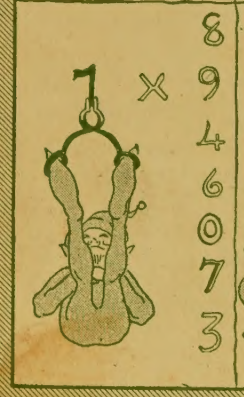
Zero,
annexing, 176
in dividend, 154, 164
in multiplicand, 98,
in multiplier, 182, 233
in quotient, 164, 239, 281
multipliers ending in, 167, 235
subtraction with, 49

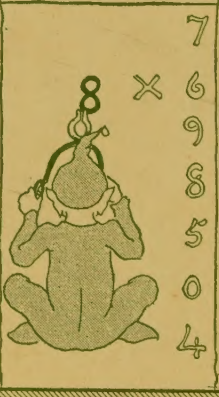
THESE GOBLINS WILL CATCH YOU IF YOU DON'T WATCH OUT

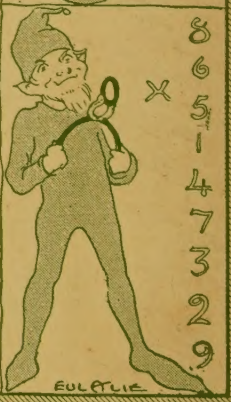
MULTIPLY THESE NUMBERS DON'T LET THE GOBLINS CATCH YOU



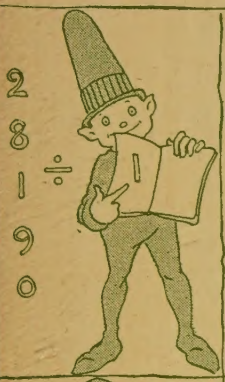




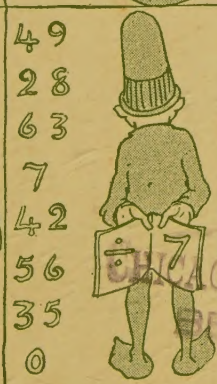




THESE GOBLINS WILL CATCH YOU IF YOU DON'T WATCH OUT



DIVIDE EACH NUMBER AT THE GOBLIN'S SIDE BY THE NUMBER ON THE PAGE OF HIS BOOK



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